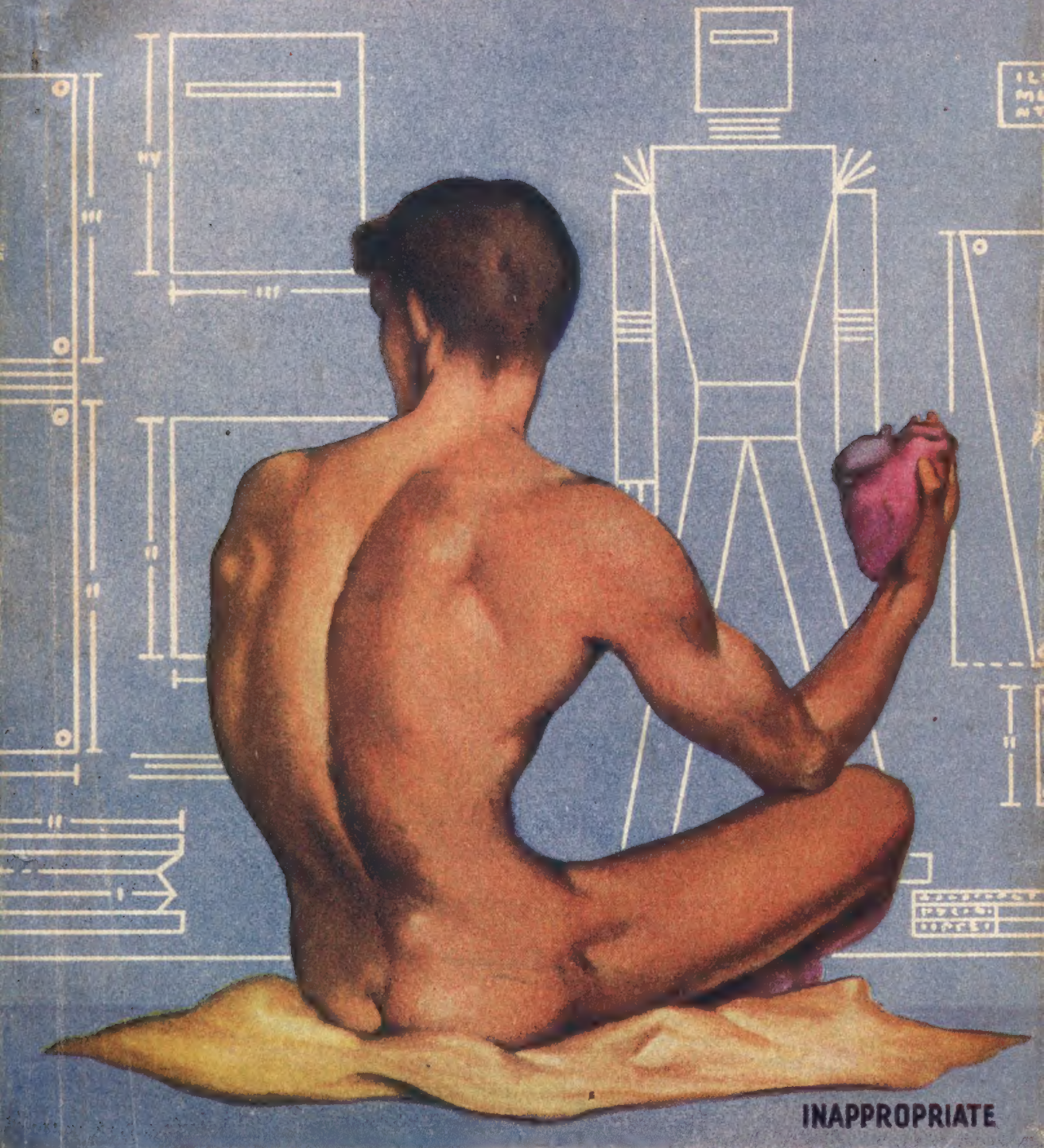
STREET & SMITH'S

December 1954

Astounding SCIENCE FICTION

BRITISH 1/6 EDITION



INAPPROPRIATE

The Hunting Lodge BY RANDALL GARRETT

Stop being a SHADOW —be a MAN!

My secret method has done wonders for Thousands—Here's what I'll PROVE it can do for YOU

Send in coupon below—and in just 7 DAYS I'll prove I can give you PERFECT MANHOOD

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NOTE: *This is a photo of Charles Atlas. This is not a studio picture but an actual untouched snapshot.*

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Astounding SCIENCE FICTION

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• NEXT ISSUE ON SALE DECEMBER 20, 1954 •

Editorial

RELATIVELY ABSOLUTE

HUMAN beings are so highly complex that, to date, no one of them has ever succeeded in figuring out (a) what he is, (b) what he wants, (c) where he's been, or (d) where he's going. Inasmuch as this includes you, me, and the rest of our friends, neighbors, and Wise Men, we need neither laugh nor shake our heads—though the gyrations resulting from the confusion above stated certainly range from the hilarious to the appalling.

Currently, the Russians are claiming that most of the major inventions of the last couple of centuries were originally made by inhabitants of that area of the world now known as the U.S.S.R. The suggestion that these inventors, who acomplished so much, lived and prospered under a Czarist society would not be welcome, in all probability. The fact that the inventors of the claimed devices generally recognized in the rest of the world—Bell, for example, as inventor of the telephone—lived in the capitalist countries is unacceptable to the Soviets, apparently. The Russian capitalist-era inventors are more acceptable, however, than non-Russian capitalist-era inventors.

This is, perhaps, an original reaction, unique to Russian Communists?

The history books available in this country's schools have a certain touch of precisely the same mechanism. Invention made by the now-enemy must be denied; invention made by the no-longer-dangerous enemy can be accepted safely.

The history books give Greece and Rome credit for starting modern science—which happens to be an extremely serious error. It's serious because it obscures a uniquely important fact: That only two cultures in the recorded history of Man have developed that combination of philosophical analysis and experimental cross-checking known as Modern Science. Greece and Rome are not among those two; neither culture achieved anything that hadn't been achieved elsewhere, and achieved a lot earlier. Oh, certainly there were details that only Rome, or only Greece achieved; it's also true that only the Greeks invented Greek as a language. The important thing is that other peoples had languages also.

The Chinese and Egyptians achieved high-order engineering several millennia before Rome did. Egypt's earliest engineering works were older, when Julius Caesar built his bridge across the Rhine, than Rome's monuments are today.

The Greeks did a lot with mathematics and geometry. The Babylonians had done so long before; the Egyptian surveyors of a few millennia before Rome was

founded did considerable first-rate math, too. The Chinese had Pythagoras' Theorem worked out, too.

The Incas, quite independently, achieved a military road system that put Rome's to shame. The Mayas had a calendar far superior to that the Greeks and Romans developed.

Observation was old. Mathematics was old. It had been done before, and in many, many places, by many, many peoples. Rome's engineering feats weren't unique.

What we know as Western Culture is a highly hybridized product of much intermingling—and has the consequent hybrid vigor. Now the curious thing about it is that there's a great tendency to resist being hybridized, and consequently a great tendency to deny that hybridization has taken place. The Western Culture is, essentially, a hybrid resultant of Judeo-Christian philosophy, based on the old Semitic fundamentals, plus Greco-Roman admixtures, plus one other highly important admixture. The Greco-Roman-Semitic philosophy hybrid resultant had not done too well by the year 1000 A.D. The Dark Ages were not to be confused with Periclean Athens as an era of intellectual achievement. They say human beings want security; they had achieved it in Europe during that period. It was a magnificently static situation; nobody learned anything new, and nobody got upset by having to face a new idea for several centuries.

"Modern History" usually is measured from the beginning of the active phase of the Renaissance. What started the Renaissance?

Our unwashed, louse-ridden, feudal, and essentially barbaric ancestors had had their thick heads knocked together vigorously, and been unceremoniously pitched out on their ears by the highly civilized, powerfully progressive Islamic peoples. That happened not once, but four successive times. With the typical barbarian's assurance that they know all there is to know that's important, the Europeans had tried marching into Palestine.

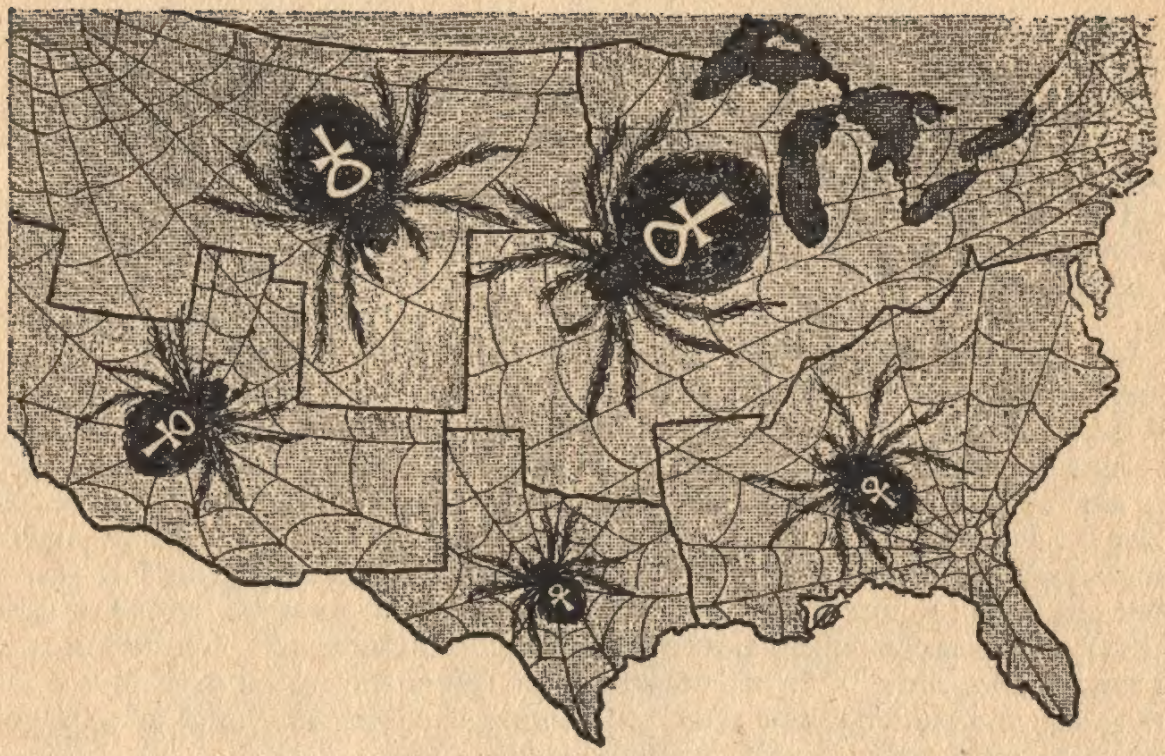
They were trounced with appalling thoroughness and ease. They never established more than a minor beachhead against an Empire that stretched from Spain to India. Their nuisance value was minor, and if they could just be induced to behave in a semicivilized manner, they were welcome to make any pilgrimages they desired.

During World War II, when the Russians drove through into Germany and the other Western European areas, their troops for the first time came into intimate contact with how the Western peoples live—what the actual Western standard of living is. It certainly isn't perfect, and is a long sight lower than it should be—but it infected the Russian troops with new and, for them, fabulously high ideas of how to live.

I suspect the same sort of thing happened to the Crusaders from Europe. Islam was civilized; Europe was not. Islam had achieved what no other civilization Man had developed or had been able to; it invented Science.

Rome didn't, and Greece didn't; they had each produced one of the two ingredients—as had many another people before them, and other peoples also produced independently after them. Philosophy is fine—but it won't stand alone. Athens fell flat on its beautifully philosophical face—for lack of an even passable sewage and water system. Rome had magnificent sanitary engineering systems—and fell flat on the problem of philosophy.

[*Continued on page* 126



THE HUNTING LODGE

By RANDALL GARRETT

A different sort of Hunting Lodge, too. The Lodge was a lot more than a house, and it had more tentacles than any octopus—and it was doing the hunting . . . for a man!

Illustrated by Kelly Freas

"WE'LL help all we can," the Director said, "but if you're caught, that's all there is to it."

I nodded. It was the age-old warning: *If you're caught, we disown you.* I wondered, fleetingly, how many men had heard that warning during the long centuries of human history, and I wondered how many of them had asked themselves the same question I was asking :

Why am *I* risking *my* neck?

And I wondered how many of them had had an answer.

"Ready, then?" the Director asked, glancing at his watch. I nodded and looked at my own. The shadow hands pointed to 2250.

"Here's the gun."

I took it and checked its loading. "Untraceable, I suppose ?"

He shook his head. "It can be traced, all right, but it won't lead to us. A gun which couldn't be traced almost certainly would be associated with us. But the best thing to do would be to bring the gun back with you; that way, it's in no danger of being traced."

The way he said it gave me a chill. He wanted me back alive, right enough, but only so there would be no evidence.

"O.K.," I said. "Let's go."

I put a nice, big, friendly grin on my face. After all, there was no use making him feel worse than necessary. I knew he didn't like sending men out to be killed. I slipped the sleeve gun into its holster and then faced him.

"Blaze away!"

He looked me over then touched the hypno controls. A light hit my eyes.

I was walking along the street when I came out of it, heading toward a flitter stand. An empty flitter was sitting there waiting, so I climbed in and sat down.

Senator Rowley's number was ORdway 63–911. I dialed it and leaned back, just as though I had every right to go there.

The flitter lifted perfectly and headed northwest, but I knew perfectly well that the scanners were going full blast, sorting through their information banks to find me.

A mile or so out of the city, the flitter veered to the right, locked its controls, and began to go around in a tight circle.

The viewphone lit up, but the screen stayed blank. A voice said: "Routine check. Identify yourself, please."

Routine! I knew better. But I just looked blank and stuck my right forearm into the checker. There was a short hum while the ultrasonic scanners looked at the tantalum identity plate riveted to the bone.

"Thank you, Mr. Gifford," said the voice. The phone cut off, but the flitter was still going in circles.

Then the phone lit again, and Senator Rowley's face—thin, dark, and bright-eyed—came on the screen.

"Gifford! Did you get it?"

"I got it, sir," I answered quietly.

He nodded, pleased. "Good! I'll be waiting for you."

Again the screen went dark, and this time the flitter straightened out and headed northwest once more.

I tried not to feel too jittery, but I had to admit to myself that I was scared. The senator was dangerous. If he could get a finger into the robot central office of the flitters, there was no way of knowing how far his control went.

He wasn't supposed to be able to tap a flitter any more than he was supposed to be able to tap a phone. But neither one was safe now.

Only a few miles ahead of me was the Lodge, probably the most tightly guarded home in the world.

I knew I might not get in, of course. Senator Anthony Rowley was no fool, by a long shot. He placed his faith in robots. A machine might fail, but it would never be treacherous.

I could see the walls of the Lodge ahead as the flitter began to use altitude. I could almost feel the watching radar eyes that followed the craft down, and it made me nervous to realize that a set of high-cycle guns were following the instructions of those eyes.

And, all alone in that big mansion—or fortress—sat Senator Rowley, like a spider in the middle of an intangible web.

The public flitter, with me in it, lit like a fly on the roof of the mansion. I took a deep breath and stepped out. The multiple eyes of the robot defenses watched me closely as I got into the waiting elevator.

The hard plastic of the little sleeve gun was supposed to be transparent to X rays and sonics, but I kept praying anyway. Suddenly I felt a tingle in my arm. I knew what it was; a checker to see if the molecular structure of the tantalum identity plate was according to government specifications in every respect.

Identity plates were furnished only by the Federal government, but they were also supposed to be the only ones with analyzers. Even the senator shouldn't have had an unregistered job.

To play safe, I rubbed at the arm absently. I didn't know whether Gifford had ever felt that tingle before or not. If he had, he might ignore it, but he wouldn't let it startle him. If he hadn't, he might not be startled, but he wouldn't ignore it. Rubbing it seemed the safest course.

The thing that kept running through my mind was—*how much did Rowley trust psychoimpressing?*

He had last seen Gifford four days ago, and at that time, Gifford could no more have betrayed the senator than one of the robots could. Because, psychologically speaking, that's exactly what Gifford had been—a robot. Theoretically, it is impossible to remove a competent psychoimpressing job in less than six weeks of steady therapy. It *could* be done in a little less time, but it didn't leave the patient in an ambient condition. And it couldn't, under any circumstances, be done in four days.

If Senator Rowley was thoroughly convinced I was Gifford, and if he trusted psychoimpression, I was in easy.

I looked at my watch again. 2250. Exactly an hour since I had left. The change in time zones had occurred while I was in the flitter, and the shadow hands had shifted back to accommodate.

It seemed to be taking a long time for the elevator to drop; I could just barely feel the movement. The robots were giving me a very thorough going over.

Finally, the door slid open and I stepped out into the lounge. For the first time in my life, I saw the living face of Senator Anthony Rowley.

The filters built into his phone pickup did a lot for him. They softened the fine wrinkles that made his face look like a piece of old leather. They added color to his greyish skin, removed the yellowishness from his eyes. In short, the senator's pickup filters took two centuries off his age.

Longevity can't do everything for you, I thought. But I could see what it *could* do, too, if you were smart and had plenty of time. And those who had plenty of time were automatically the smart ones.

The senator extended a hand. "Give me the brief case, Gifford."

"Yes, sir." As I held out the small blue case, I glanced at my watch. 2255. And, as I watched, the last five became a six.

Four minutes to go.

"Sit down. Gifford." The senator waved me to a chair. I sat and watched him while he leafed through the supposedly secret papers.

Oh, they were real enough, all right, but they didn't contain any information that would be of value to him. He would be too dead for that.

He ignored me as he read. There was no need to watch Gifford. Even if Gifford had tried anything, the robotic brain in the basement of the house would have detected it with at least one of its numerous sensory devices and acted to prevent the senator's death long before any mere human could complete any action.

I knew that, and the senator knew it.

We sat.

2257.

The senator frowned. "This is all, Gifford?"

"I can't be sure, of course, sir. But I will say that any further information on the subject is buried pretty deeply. So well hidden, in fact, that even the government couldn't find it in time to use against you."

"Mmmmmm."

2258.

The senator grinned. "This is it," he said through his tight, thin, old lips. "We'll be in complete control within a year, Gifford."

"That's good, sir. Very good."

It doesn't take much to play the part of a man who's been psychoimpressed as thoroughly as Gifford had been.

2259.

The senator smiled softly and said nothing. I waited tensely, hoping that the darkness would be neither too long nor too short. I made no move toward the sleeve gun, but I was ready to grab it as soon as—

2300!

The lights went out—and came on again.

The senator had time to look both startled and frightened before I shot him through the heart.

I didn't waste any time. The power had been cut off from the Great Northwestern Reactor, which supplied all the juice for the whole area, but the senator had provided wisely for that. He had a reactor of his own built in for emergencies; it had cut in as soon as the Great Northwestern had gone out.

But cutting off the power to a robot brain is the equivalent of hitting a man over the head with a blackjack; it takes time to recover. It was that time lapse which had permitted me to kill Rowley and which would, if I moved fast enough, permit me to escape before its deadly defenses could be rallied against me.

I ran toward a door and almost collided with it before I realized that it wasn't going to open for me. I had to push it aside. I kept on running, heading for an outside entrance. There was no way of knowing how long the robot would remain stunned.

Rowley had figured he was being smart when he built a single centralized computer to take over all the defenses of the house instead of having a series of simple brains, one for each function. And, in a way, I guess he was right; the Lodge could act as a single unit that way.

But Rowley had died because he insisted on that complication; the simpler the brain, the quicker the recovery.

The outside door opened easily enough; the electrolocks were dead. I was still surrounded by walls; the nearest exit was nearly half a mile away. That didn't bother me; I wasn't going to have to use it. There was a high-speed flitter waiting for me above the clouds.

I could hear it humming down toward me. Then I could see it, drifting down in a fast spiral.

Whoom!

I was startled for a timeless instant as I saw the flitter dissolve in a blossom of yellow-orange flame. The flare, marking the end of my escape craft, hung in the air for an endless second and then died slowly.

I realized then that the heavy defenses of the Lodge had come to life.

I didn't even stop to think. The glowing red of the fading explosion was still lighting the ground as I turned and sprinted toward the garage. One thing I knew; the robot would not shoot down one of the senator's own machines unless ordered to do so.

The robot was still not fully awake. It had reacted to the approach of a big, fast-moving object, but it still couldn't see a running man. Its scanners wouldn't track yet.

I shoved the garage doors open and looked inside. The bright lights disclosed ground vehicles and nothing more. The flitters were all on the roof.

I hadn't any choice; I had to get out of there, and fast!

The senator had placed a lot of faith in the machines that guarded the Lodge. The keys were in the lock of one big Ford-Studebaker. I shoved the control from auto to manual, turned the key and started the engines.

As soon as they were humming, I started the car moving. And none too soon, either. The doors of the garage slammed after me like the jaws of a man trap. I gunned the car for the nearest gate, hoping that this one last effort would be successful. If I didn't make it through the outer gate, I might as well give up.

As I approached the heavy outer gates, I could see that they were functioning; I'd never get them open by hand. But the robot was still a little confused. It recognized the car but didn't recognize me. The gates dropped, so I didn't even slow the car. Pure luck again.

And close luck, at that. The gates tried to come back up out of the ground even as the heavy vehicle went over them; there was a loud bump as the rear wheels hit the top of the rising gate. But again the robot was too late.

I took a deep breath and aimed the car toward the city. So far, so good. A clean getaway.

Another of the Immortals was dead. Senator Rowley's political machine would never again force through a vote to give him another longevity treatment, because the senator's political force had been cut off at the head, and the target was gone. Pardon the mixed metaphor.

Longevity treatments are like a drug; the more you have, the more you want. I suppose it had been a good idea a few centuries ago to restrict their use to men who were of such use to the race that they deserved to live longer than

the average. But the mistake was made in putting it up to the voting public who should get the treatments.

Of course, they'd had a right to have a voice in it; at the beginning, the cost of a single treatment had been too high for any individual to pay for it. And, in addition, it had been a government monopoly, since the government had paid for the research. So, if the taxpayer's money was to be spent, the taxpayer had a right to say who it was to be spent on.

But if a man's life hangs on his ability to control the public, what other out does he have?

And the longer he lives the greater his control. A man can become an institution if he lives long enough. And Senator Rowley had lived long enough; he—

Something snickered on the instrument panel. I looked, but I couldn't see anything. Then something moved under my feet. It was the accelerator. The car was slowing.

I didn't waste any time guessing; I knew what was happening. I opened the door just as the car stopped. Fortunately, the doors had only manual controls; simple mechanical locks.

I jumped out of the car's way and watched it as it backed up, turned around, and drove off in the direction of the Lodge. The robot was fully awake now; it had recalled the car. I hadn't realized that the senator had set up the controls in his vehicles so that the master robot could take control away from a human being.

I thanked various and sundry deities that I had not climbed into one of the flitters. It's hard to get out of an aircraft when it's a few thousand feet above the earth.

Well, there was nothing to do but walk. So I walked.

It wasn't more than ten minutes before I heard the buzzing behind me. Something was coming over the road at a good clip, but without headlights. In the darkness, I couldn't see a thing, but I knew it wasn't an ordinary car. Not coming from the Lodge.

I ran for the nearest tree, a big monster at least three feet thick and fifty or sixty feet high. The lowest branch was a heavy one about seven feet from the ground. I grabbed it and swung myself up and kept on climbing until I was a good twenty feet off the ground. Then I waited.

The whine stopped down the road about half a mile, about where I'd left the Ford-Studebaker. Whatever it was prowled around for a minute or two. then started on coming down the road.

When it finally came close enough for me to see it in the moonlight, I recognized it for what it was. A patrol robot. It was looking for me.

Then I heard another whine. But this one was different; it was a siren coming from the main highway.

Overhead, I heard a flitter whistling through the sky.

The police.

The patrol robot buzzed around on its six wheels, turning its search-turret this way and that, trying to spot me.

The siren grew louder, and I saw the headlights in the distance. In less than a minute, the lights struck the patrol robot, outlining every detail of the squat,

ugly silhouette. It stopped, swiveling its turret toward the police car. The warning light on the turret came on, glowing a bright red.

The cops slowed down and stopped. One of the men in the car called out: "Senator? Are you on the other end of that thing?"

No answer from the robot.

"I guess he's really dead," said another officer in a low, awed voice.

"It don't seem possible," the first voice said. Then he called again to the patrol robot. "We're police officers. Will you permit us to show our identification?"

The patrol robot clicked a little as the information was relayed back to the Lodge and the answer given. The red warning light turned green, indicating that the guns were not going to fire.

About that time, I decided that my only chance was to move around so that the trunk of the tree was between me and the road. I had to move slowly so they wouldn't hear me, but I finally made it.

I could hear the policeman saying: "According to the information we received, Senator Rowley was shot by his secretary, Edgar Gifford. This patrol job must be hunting him."

"Hey!" said another voice. "Here comes another one! He must be in the area somewhere!"

I could hear the whining of a second patrol robot approaching from the Lodge. It was still about a mile away, judging from the sound.

I couldn't see what happened next, but I could hear the first robot moving, and it must have found me, even though I was out of sight. Directional heat detector, probably.

"In the tree, eh?" said a cop.

Another called: "All right, Gifford! Come on down!"

Well, that was it. I was caught. But I wasn't going to be taken alive. I eased out the sleeve gun and sneaked a peek around the tree. *No use killing a cop,* I thought, *he's just doing his job.*

So I fired at the car, which didn't hurt a thing.

"Look out!"

"Duck!"

"Get that blaster going!"

Good. It was going to be a blaster. It would take off the tree top and me with it. I'd die quickly.

There was a sudden flurry of shots, and then silence.

I took another quick peek and got the shock of my life.

The four police officers were crumpled on the ground, shot down by the patrol robot from the Lodge. One of them—the one holding the blaster—wasn't quite dead yet. He gasped something obscene and fired the weapon just as two more slugs from the robot's turret hit him in the chest.

The turret exploded in a gout of fire.

I didn't get it, but I didn't have time to wonder what was going on. I know a chance when I see one. I swung from the branch I was on and dropped to the ground, rolling over in a bed of old leaves to take up the shock. Then I made a beeline for the police car.

On the way I grabbed one of the helmets from a uniformed corpse, hoping that my own tunic was close enough to the same shade of scarlet to get me by. I climbed in and got the machine turned around just as the second patrol robot came into sight. It fired a couple of shots after me, but those patrol jobs don't have enough armament to shoot down a police car; they're strictly for hunting unarmed and unprotected pedestrians.

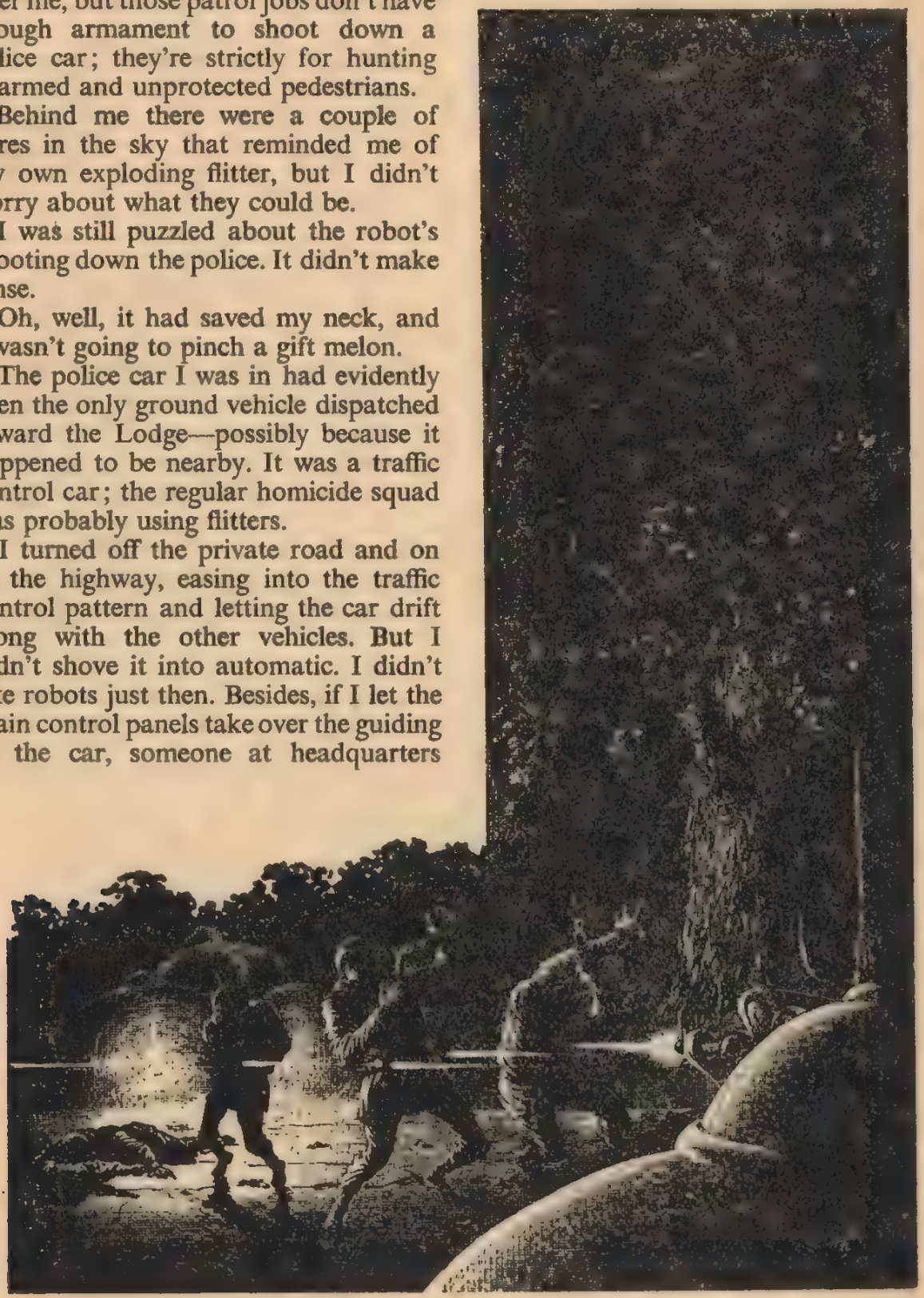
Behind me there were a couple of flares in the sky that reminded me of my own exploding flitter, but I didn't worry about what they could be.

I was still puzzled about the robot's shooting down the police. It didn't make sense.

Oh, well, it had saved my neck, and I wasn't going to pinch a gift melon.

The police car I was in had evidently been the only ground vehicle dispatched toward the Lodge—possibly because it happened to be nearby. It was a traffic control car; the regular homicide squad was probably using flitters.

I turned off the private road and on to the highway, easing into the traffic control pattern and letting the car drift along with the other vehicles. But I didn't shove it into automatic. I didn't like robots just then. Besides, if I let the main control panels take over the guiding of the car, someone at headquarters



might wonder why car such-and-such wasn't at the Lodge as ordered; they might wonder why it was going down the highway so unconcernedly.

There was only one drawback. I wasn't used to handling a car at a hundred and fifty to two hundred miles an hour. If something should happen to the traffic pattern, I'd have to depend on my own reflexes. And they might not be fast enough.

I decided I'd have to ditch the police car as soon as I could. It was too much trouble and too easy to spot.

I had an idea. I turned off the highway again at the next break, a few miles farther on. There wasn't much side traffic at that time of night, so I had to wait and headed down the side road.

I hit the siren and pulled him over to the side.

He was an average-sized character with a belligerent attitude and a fat face.

"What's the matter, officer? There was nothing wrong with that break. I didn't cut out the pattern on manual, you know. I was—" He stopped when he realized that my tunic was not that of a policeman. "Why, you're not—"

By then, I'd already cut him down with a stun gun I'd found in the arms compartment of the police car. I hauled him out and changed tunics with him. His was a little loose, but not so much that it would be noticeable. Then I put the helmet on his head and strapped him into the front seat of the police vehicle with the safety belt.

After being hit with a stun gun, he'd be out for a good hour. That would be plenty of time as far as I was concerned.

I transferred as much of the police armory as I thought I'd need into the fat-faced fellow's machine and then I climbed into the police car with him. I pulled the car around and headed back toward the highway.

Just before we reached the control area, I set the instruments for the Coast and headed him west, back the way I had come.

I jumped out and slammed the door behind me as the automatic controls took over and put him in the traffic pattern.

Then I walked back to Fatty's car, got in, and drove back to the highway. I figured I could trust the controls of a private vehicle, so I set them and headed east, toward the city. Once I was there, I'd have to get a flitter, somehow.

I spent the next twenty minutes changing my face. I couldn't do anything about the basic structure; that would have to wait until I got back. Nor could I do anything about the ID plate that was bolted to my left ulna; that, too, would have to wait.

I changed the colour of my hair, darkening it from Gifford's gray to a mousy brown, and I took a patch of hair out above my forehead to give me a balding look. The mustache went, and the sides of the beard, giving me a goatee effect. I trimmed down the brows, and the hair, and put a couple of tubes in my nostrils to widen my nose.

I couldn't do much about the eyes; my little pocket kit didn't carry them. But, all in all, I looked a great deal less like Gifford than I had before.

Then I proceeded to stow a few weapons on and about my person. I had taken the sleeve gun out of the scarlet tunic when I'd put it on the fat-faced man, but his own chartreuse tunic didn't have a sleeve holster, so I had to put the gun in a hip pocket. But the tunic was a godsend in another way; it was loose enough to carry a few guns easily.

The car speaker said: "Attention! You are now approaching Groverton, the last suburb before the city limits. Private automobiles may not be taken beyond this point. If you wish to by-pass the city, please indicate. If not, please go to the free storage lot in Groverton."

I decided I'd do neither. I might as well make the car as hard to find as possible. I took it to an all-night repair technician in Groverton.

"Something wrong with the turbos," I told him. "Give her a complete overhaul."

He was very happy to do so. He'd be mighty unhappy when the cops took the car away without paying him for it, but he didn't look as though he'd go broke from the loss. Besides, I thought it would be a good way to repay Fat Face for borrowing his car.

I had purposely kept the hood of my tunic up while I was talking to the auto technician so he wouldn't remember my new face later on, but I dropped the hood as soon as I got to the main street of Groverton. I didn't want to attract too much attention.

I looked at my watch. 0111. I'd passed back through the time-change again, so it had been an hour and ten minutes since I'd left the Lodge. I decided I needed something to eat.

Groverton was one of those old-fashioned suburbs built during the latter half of the twentieth century—sponge glass streets and sidewalks, aluminum siding on the houses, shiny chrome-and-lucite business buildings. Real quaint.

I found an automat and went in. There were only a few people on the streets, but the automat wasn't empty by a long shot. Most of the crowd seemed to be teen-age kids getting looped up after a dance. One booth was empty, so I sat down in it, dialed for coffee and ham and eggs, and dropped in the indicated change.

Shapeless little blobs of color were bouncing around in the tri-di tank in the wall, giving a surrealistic dance accompaniment to "Anna from Texarkana":

You should have seen the way she ate!
Her appetite insatiate
Was quite enough to break your pocket-book!
But with a yeast-digamma steak,
She never made a damn mistake—
What tasty synthefoods that gal could cook!
Oh, my Anna! Her algae Manna
Was tasty as a Manna-cake could be!
Oh, my Anna—from Texarkana!
Oh, Anna, baby, you're the girl for me!

I sipped coffee while the thing went through the third and fourth verses, trying to figure a way to get into the city without having to show the telltale ID plate in my arm.

"Anna" was cut off in the middle of the fifth verse. The blobs changed color and coalesced into the face of Quinby Lester, news analyst.

"Good morning, free citizens! We are interrupting this program to bring you an announcement of special importance."

He looked very serious, very concerned, and, I thought, just a little bit puzzled. "At approximately midnight last night, there was a disturbance at the Lodge. Four police officers who were summoned to the Lodge were shot and killed by Mr. Edgar Gifford, the creator of the disturbance. This man is now at large in the vicinity. Police are making an extensive search within a five-hundred-mile radius of the Lodge.

"Have you seen this man?"

A tri-di of Gifford appeared in place of Lester's features.

"This man is armed and dangerous. If you see him, report immediately to MONmouth 6–666–666. If your information leads to the capture of Edgar Gifford, you will receive a reward of ten thousand dollars. Look around you! He may be near you now!"

Everybody in the automat looked apprehensively at everybody else. I joined them. I wasn't much worried about being spotted. When everybody wears beards, it's hard to spot a man under a handful of face foliage. I was willing to bet that within the next half hour the police would be deluged with calls from a thousand people who honestly thought they had seen Edgar Gifford.

The cops knew that. They were simply trying to scare me into doing something foolish.

They needn't have done that; I was perfectly capable of doing something foolish without their help.

I thought carefully about my position. I was about fifteen miles from safety. Question: Could I call for help? Answer: No. Because I didn't know the number. I didn't even know who was waiting for me. All that had been erased from my mind when the Director hypnoed me. I couldn't even remember who I was working for or why!

My only chance was to get to Fourteenth and Riverside Drive. They'd pick me up there.

Oh, well, if I didn't make it, I wasn't fit to be an assassin, anyway.

I polished off the breakfast and took another look at my watch. 1047. I might as well get started; I had fifteen miles to walk.

Outside, the streets were fairly quiet. The old-fashioned streets hadn't been built to clean themselves; a robot sweeper was prowling softly along the curb, sucking up the day's debris, pausing at every cross street to funnel the stuff into the disposal drains to be carried to the processing plant.

A few people were walking the streets. Ahead of me, a drunk was sitting on the curb sucking at a bottle that had collapsed long ago, hoping to get one last drop out of it.

I decided the best way to get to my destination was to take Bradley to Macmillan, follow Macmillan to Fourteenth, then stay on Fourteenth until I got to Riverside Drive.

But no free citizen would walk that far. I'd better not look like one. I walked up to the swiller.

"Hey, Joe, how'd you like to make five?"

He looked up at me, trying to focus. "Sure, Sid, sure. Whatta gotta do?"

"Sell me your tunic."

He blinked. "Zissa gag? Ya get 'em free."

"No gag. I want your tunic."

"Sure. Fine. Gimme that five."

He peeled off the charity brown tunic and I handed him the five note. If I had him doped out right, he'd be too drunk to remember what had happened to his tunic. He'd be even drunker when he started on that five note.

I pulled the brown on over the chartreuse tunic. I might want to get into a first-class installation, and I couldn't do it wearing charity brown.

"*LOOK OUT!*"

CLIKLIKLIKLIKLIKLIK!

I felt something grab my ankle and I turned fast. It was the street cleaner! It had reached out a retractable picker and was trying to lift me into its hopper!

The drunk, who had done the yelling, tried to back away, but he stumbled and banged his head on the soft sidewalk. He stayed down—not out, but scared.

Another claw came out of the cleaner and grabbed my shoulder. The two of them together lifted me off the ground and pulled me toward the open hopper. I managed to get my gun out. These cleaners weren't armored; if I could only get in a good shot—

I fired three times, blowing the pickup antenna off the control dome. When the claws opened, I dropped to the sidewalk and ran. Behind me, the robot, no longer under the directions of the central office, began to flick its claws in and out and run around in circles. The drunk didn't manage to get out from under the treads in time.

A lot of people had stopped to watch the brief tussle, a few of them pretty scared. It was unheard of for a street cleaner to go berserk like that.

I dodged into an alleyway and headed for the second level. I was galloping up the escalator full tilt when the cop saw me. He was on the other escalator, going down, but he didn't stay there long.

"Halt!" he yelled, as he vaulted over the waist-high partition and landed on the UP escalator. By that time, I was already on the second level and running like mad.

"Halt or I fire!" he yelled.

I ducked into a doorway and pulled out the stun gun. I turned just in time to see one of the most amazing sights I have ever been privileged to witness. The cop was running towards me, his gun out, when he passed in front of a bottled goods vendor. At that instant, the vendor opened up, delivering a veritable avalanche of bottles into the corridor. The policeman's foot hit one of the rubbery, bouncing cylinders and clipped just as he pulled the trigger.

His shot went wild, and I fired with the stun gun before the cop could hit the floor. He lay still, bottles rolling all around him.

I turned and ran again. I hadn't gone far before another cop showed up, running towards me. I made a quick turn toward the escalators and went down again toward street level.

The cop wasn't prepared for what happened to him when he stepped on the escalator. He was about halfway down, running, when the belt suddenly stopped and reversed itself. The policeman pitched forward on his face and tumbled down the stair.

I didn't wait to see what happened next. I turned the corner, slowed down, and walked into a bar. I tried to walk slowly enough so that I wouldn't attract attention and headed for the rest room.

I went in, locked the door behind me, and looked around.

As far as I could tell, there was no sensory devices in the place, so I pulled the last of my make-up kit out and went to work. This time, I went whole hog. Most of the hair went from the top of my head, and what was left became pure white. I didn't take off the goatee; a beardless man would stand out. But the goatee went white too.

Then a fine layer of plastic sprayed on my face and hands gave me an elderly network of wrinkles.

All the time I was doing this, I was wondering what was going on with the robots. It was obvious to me that the Lodge was connected illegally with every robot service in the city—possibly in the whole sector.

The street sweeper had recognized me and tried to get me; that was clear enough. But what about the vending machine and the escalator? Was the Lodge's master computer still foggy from the power cutoff? It shouldn't be; not after two hours. Then why had the responses been so slow? Why had they tripped the cops instead of me. It didn't make sense.

That's when it hit me. *Was Rowley really dead?*

I couldn't be absolutely sure, could I? And the police hadn't said anything about a murder. Just a "disturbance." No, wait. The first cops, the ones whose car I'd taken. What had they said the robot reported? I couldn't remember the exact words.

It still didn't settle the question.

For a moment, I found myself wishing we had a government like the United States had had back in the third quarter of the Twentieth Century, back in the days of strong central government, before everybody started screaming about Citizen's Rights and the preservation of the *status quo*. There wouldn't be any of this kind of trouble now—maybe.

But they had other kinds just as bad.

This wasn't the best of all possible worlds, but I was living in it. Of course, I didn't know how long that happy situation would exist just then.

Somebody rapped on the door.

I didn't know who it was, but I wasn't taking any chances. Maybe it was a cop. I climbed out the back window and headed down the alley toward Bradley Avenue.

If only I could get rid of that plate in my arm! The average citizen doesn't know it, but it isn't really necessary to put your arm in an ID slot to be identified. A sonobeam can pick up a reflected recording from your plate at twenty feet if there's a scanner nearby to direct it.

I walked slowly after running the length of the alley, staying in the shadows as much as possible, trying to keep out of the way of anyone and everyone.

For six blocks or so I didn't see a soul. Then, just as I turned onto West Bradley, I came face to face with a police car. I froze.

I was ready to pull and shoot; I wanted the cop to kill me before he picked me up.

He slowed up, looked at me sharply, looked at his instrument panel, then drove on. I just stood there, flabbergasted. I knew as well as I knew anything that he'd beamed that plate in my arm!

As the car turned at the next corner, I backed into a nearby doorway, trying

to figure out what I should do next. Frankly, I was jumpy and scared; I didn't know what they were up to.

I got even more jumpy when the door behind me gave. I turned fast and made a grab for my gun. But I didn't take it out.

The smoothly dressed girl said: "What's the matter, Grandfather?"

It wasn't until then that I realized how rattled I was. I looked like a very old man, but I wasn't acting like one. I paused to force my mind to adjust.

The girl was in green. The one-piece shortsuit, the sandals, the toenails, fingernails, lips, eyes, and hair. All green. The rest of her was a smooth, even shade of pink.

She said: "You needn't be afraid that anyone will see you. We arrange—Oh!"

I knew what she was *oh*'ing about. The charity brown of my tunic.

"I'm sorry," she said, frowning. "We can't—"

I cut her off this time. "I have money, my dear," I smiled. "And I'm wearing my own tunic." I flashed the chartreuse on her by opening the collar.

"I see, Grandfather. Won't you come in?"

I followed the green girl in to the desk of the Program Planner, a girl who was a deep blue in the same way that the first girl was green. I outlined what I wanted in a reedy, anticipating voice and was taken to a private room.

I locked the door behind me. A plaque on the door was dated and sealed with the City stamp.

GUARANTEE OF PRIVACY

This room has been inspected and sealed against scanners, microphones, and other devices permitting the observatior or recording or actions within it, in accordance with the provisions of the Privacy Act.

That was all very fine, but I wouldn't put enough faith in it to trust my life to it. I relaxed in a soft, heavy lounge facing the one-way wall. The show was already going on. I wasn't particularly interested in the fertility rites of the worshipers of Mahrud—not because they weren't intrinsically interesting, but because I had to do some thinking to save my own skin.

Senator Rowley, in order to keep his section under control, had coupled in his own robot's sensory organs with those of the city's Public Services Department and those of various business concerns, most of which were either owned outright or subsidized by the senator.

But something had happened to that computer; for some reason, its actions had become illogical and inefficient. When the patrol car had spotted me on the street, for instance, the sonobeam, which had penetrated the flesh of my arm and bounced off the tantalum plate back to the pickup, had relayed the modified vibrations back to the Central Files for identification. And the Files had obviously given back the wrong information.

What had gone wrong? Was the senator still alive, keeping his mouth shut and his eyes open? If so, what sort of orders was he giving to the robot? I didn't get many answers, and the ones I did get were mutually contradictory.

I was supposed to be back before dawn, but I could see now that I'd never make it. Here in Groverton, there weren't many connections with Public

Services; the robot couldn't keep me under observation all the time. But the deeper into the city I penetrated, the more scanners there would be. I couldn't take a private car in, and I didn't dare take a flitter or a ground taxi. I'd be spotted in the subways as soon as I walked in. I was in a fix, and I'd have to think my way out.

I don't know whether it was the music or the soft lights or my lack of sleep or the simple fact that intense concentration is often autohypnotic. At any rate, I doped off, and the next thing I remember is the girl bringing in the papers.

This gal was silver. I don't know how the cosmeticians had done it, but looking into her eyes was like looking into a mirror; the irises were a glittering silver halo surrounding the dark pupil. Her hair was the same way; not white, but silver.

"Good morning, Grandfather," she said softly. "Here are the newspapers you asked for."

I was thankful for that "Grandfather"; it reminded me that I was an old man before I had a chance to say anything.

"Thank you, my dear, thank you. Just put them here."

"Your coffee will be in in a moment." She moved out as quietly as she had come in.

Something was gnawing at the back of my brain; something like a dream you know you've had but forgotten completely. I concentrated on it a moment, trying to bring it out into the open, but it wouldn't come, so I gave it up and turned to the paper, still warm from the reproducer.

It was splattered all over the front page.

MYSTERIOUS TROUBLE AT THE LODGE

Police Unable To Enter

The Police Department announced this morning that they have been unable, thus far, to pass the defenses of the Lodge after receiving a call last night that Senator Rowley had been shot by his secretary, Mr. Edgar Gifford.

Repeated attempts to contact the senator have resulted in failure, says a Department spokesman.

Thus far, three police flitters under robot control have been shot down in attempting to land at the Lodge, and one ground car has been blown up. Another ground car, the first to respond to the automatic call for help, was stolen by the fleeing Gifford after killing the four officers in the car. The stolen vehicle was recovered early this morning several hundred miles from here, having been reported by a Mr.—

It went on with the usual statement that the police expected to apprehend the murderous Mr. Gifford at any moment.

Another small item in the lower left-hand corner registered the fact that two men had been accidentally caught by a street cleaner and had proceeded to damage it. One of the men was killed by the damaged machine, but the other managed to escape. The dead man was a charity case named Brodwick, and his associates were being checked.

So much for that. But the piece that really interested me was the one that said:

SENATOR LUTHER GRENDON OFFERS AID

"Federal Government Should Keep Hands Off," says Grendon.

Eastern Sector Senator Grendon said early this morning that he would do all in his power to aid Northwestern Sector in "apprehending the murderer of my colleague and bring to justice the organization behind him."

"There is," he said, "no need to call in the Federal Government at this time. The citizens of an independent sector are quite capable of dealing with crime within their own boundaries."

Interviewed later, Senator Quintell of Southwestern Sector agreed that there was no need to call in the FBI or "any other Federal Agency."

The other senators were coming in for the kill, even before it was definitely established that the senator was dead.

Well, that was that. I decided I'd better get going. It would be better to travel during the daytime: it's hard for a beam to be focused on an individual citizen in a crowd.

While the other Immortals were foreclosing on Senator Rowley's private property, there might be time for me to get back safely.

The silver girl was waiting for me as I stepped out the door to the private room.

"This way, Grandfather," she said, the ever-present smile on her glittering lips. She started down the corridor.

"This isn't the way out," I said, frowning.

She paused, still smiling. "No, sir, it isn't the way you came in, but you see, our number has come up. The Medical Board has sent down a checker."

That almost floored me. Somehow, the Lodge had known where I was and had instituted a check against this particular house. That meant that every door was sealed except the one where the robot Medical checker was waiting.

The perfect trap. The checker was armed and armored, naturally; there were often people who did not want to be detained at the hospital—and at their own expense, if they were free citizens.

I walked slowly, as an old man should, stalling for time. The only armament a checker had was a stun gun; that was a point in my favor. But I needed more information.

"My goodness," I said, "you should have called me earlier, my dear, as soon as the checker came."

"It's only been here fifteen minutes, Grandfather," the silver girl answered.

Then there were still plenty of customers in the building!

The girl was just ahead of me in the corridor. I beamed her down with the stun gun and caught her before she hit the floor. I carried her back into the private room I had just left and laid her on the couch.

Then I started pulling down draperies. They were all heavy synthetic stuff that wouldn't burn unless they were really hot. I got a good armful, went back into the corridor, and headed for the opposite end of the building. Nobody bothered me on the way; everybody was still occupied.

At the end of the hall, I piled the stuff on the floor beneath some other hangings. Then I took two of the power cartridges from the stun gun and pried them open. The powder inside ought to burn nicely. It wouldn't explode unless it was sealed inside the gun, where the explosion was channeled through the supersonic whistle in the barrel to form the beam.

I took out my lighter and applied the flame to a sheet of newspaper I had brought along, then I laid the paper on top of the opened cartridges. I got well back and waited.

It didn't take more than a second or two to ignite the powder. It hissed and went up in a wave of white heat. The plastic curtains started to smolder. Within less than a minute, the hallway was full of thick, acrid smoke.

I knew the building wouldn't burn, but I was hoping none of the other customers were as positive as I.

I yelled "Fire!" at the top of my lungs, then headed for the stairway and ran to the bottom. I waited just inside the street door for action.

Outside, I could hear the soft humming of a guard robot, stationed there by the checker to make sure no one left through that door.

The smoldering of the curtains put out plenty of smoke before they got hot enough to turn in the fire alarm and bring out the fire-fighter robots stationed in the walls. The little terrier-sized mechanisms scurried all over the place, looking for heat sources to squirt at. Upstairs, a heavy CO_2 blanket began to drift down.

I wasn't worried about the fire robots; they didn't have the sensory apparatus to spot me. All they could find was fire. They would find it and smother it, but the place was already full of smoke, which was all I wanted.

It was the smoke that did the job, really. People don't like to stay in buildings

that appear to be burning down, no matter how safe they think they are. Customers came pouring down the stairway and out the door like angry wasps out of a disturbed hive. I went with them.

I knew that a fire signal would change the checker's orders. It couldn't keep people inside a building burning. Unfortunately, I hadn't realized to what extent the Lodge would go to get me, or to what extent it was capable of countermanding normal orders.

The guard robot at the door started beaming down everybody as they came out, firing as fast as it could scan and direct. It couldn't distinguish me from the others, of course; not in that mob. But it was hitting everything that moved with its stun beam. Luckily, it couldn't scan and direct fast enough to get everybody; there were too many. I watched and waited for a second or two until the turret was facing away from the corner, then I ran like the very devil, dodging as I ran.

A stun beam hit the fingers of my left hand, and my arm went dead to the elbow. The guard robot had spotted me! I made it around the corner and ducked into a crowd of people who were idly watching the smoke billowing from the upper windows.

I kept moving through the crowd, trying to put as much distance between myself and the checker's guards as possible. The guard evidently hadn't recognized, me personally, as Gifford, because it realized the futility of trying to cut down everyone in Groverton to find me and gave up on the crowd outside. But it kept hitting the ones who came out the door.

I got away fast. The thing really had me worried. I had no desire whatever to get myself mixed up with a nutty robot, but, seemingly, there was no way to avoid it.

I circled around and went down to Corliss Avenue, parallel to Bradley, for about seven blocks before I finally walked back over to Bradley again. Two or three times, police cars came by, but either they didn't test me with their beams or the answers they got weren't incriminating.

I was less than a block from the city limits when something hard and hot and tingling burned through my nerves like acid and I blacked out.

Maybe you've never been hit by a stun beam, but if you've ever had your leg go to sleep, you know what it feels like. And you know what it feels like when you wake up; that painful tingling all over that hurts even worse if you try to move.

I knew better than to try to move. I just lay still, waiting for the terrible tingling to subside. I had been out, I knew, a little less than an hour. I knew, because I'd been hit by stunners before, and I know how long it takes my body to throw off the paralysis.

Somebody's voice said: "He'll be coming out of it anytime now. Shake him and see."

A hand shook me, and I gasped. I couldn't help it; with my nerves still raw from the stunner, it hurt to be shaken that way.

"Sorry, Gifford," said another voice, different from the first. "Just wanted to see. Wanted to see if you were with us."

"Leave him alone a few minutes," the first voice said. "That hurts. It'll wear off quickly."

It was wearing off already. I opened my eyes and tried to see what was going on. At first, the visual pattern was a blithering swirl of meaningless shapes and crackling colors, but it finally settled down to a normal ceiling with a normal light panel in it. I managed to turn my head, in spite of the nerve-shocks, and saw two men sitting in chairs beside the bed.

One of them was short, round, and blond, with a full set of mutton chops, a heavy mustache, and a clean-shaven, firm chin. The other man was taller, muscular, with a full Imperial and smooth cheeks.

The one with the Imperial said: "Sorry we had to shoot you down that way, Gifford. But we didn't want to attract too much attention that close to the city limits."

They weren't cops, then. Of that much, I could be certain. At least they weren't the police of this sector. So they were working for one of the other Immortals.

"Whose little boys are you?" I asked, trying to grin.

Evidently I did grin, because they grinned back. "Funny," said the one with the mutton chops, "but that's exactly what we were going to ask you."

I turned my head back again and stared at the ceiling. "I'm an orphan," I said.

The guy with the mutton chops chuckled. "Well," he grinned at the other man, "what do you think of that, colonel?"

The colonel (*Of what?* I wondered) frowned, pulling heavy brows deep over his gray eyes. His voice came from deep in his chest and seemed to be muffled by the heavy beard.

"We'll level with you, Gifford. Mainly because we aren't sure. Mainly because of that. We aren't sure even you know the truth. So we'll level."

"Your blast," I said.

"O.K., here's how it looks from our side of the fence. It looks like this. You killed Rowley. After fifteen years of faithful service, you killed him. Now we know—even if you don't—that Rowley had you psychoimpressed every six months for fifteen years. Or at least he thought he did."

"He *thought* he did?" I asked, just to show I was interested.

"Well, yes. He couldn't have, really, you see. He couldn't have. Or at least not lately. A psychoimpressed person can't do things like that. Also, we know that nobody broke it, because it takes six weeks of steady, hard therapy to pull a man out of it. And a man's no good after that for a couple more weeks. You weren't out of Rowley's sight for more than four days." He shrugged. "You see?"

"I see," I said. The guy was a little irritating in his manner. I didn't like the choppy way he talked.

"For a while," he said, "we thought it might be an impersonation. But we checked your plate"—he gestured at my arm—"and it's O.K. The genuine article, So it's Gifford's plate, all right. And we know it couldn't have been taken out of Gifford's arm and transferred to another arm in four days.

"If there were any way to check fingerprints and eye patterns, we might be able to be absolutely sure, but the Privacy Act forbids that, so we have to go on what evidence we have in our possession now.

"Anyway, we're convinced that you are Gifford. So that means somebody has been tampering with your mind. We want to know who it is. Do you know?"

"No," I said, quite honestly.

"You didn't do it yourself, did you?"

"No."

"Somebody's behind you?"

"Yes."

"Do you know who?"

"No. And hold those questions a minute. You said you'd level with me. Who are *you* working for?"

The two of them looked at each other for a second, then the colonel said: "Senator Quintell."

I propped myself up on one elbow and held out the other hand, fingers extended. "All right, figure for yourself. Rowley's out of the picture; that eliminates him." I pulled my thumb in. "You work for Quintell; that eliminates him." I dropped my little finger and held it with my thumb. "That leaves three Immortals. Grendon, Lasser, and Waterford. Lasser has the Western Sector; Waterford, the Southern. Neither borders on Northwestern, so that eliminates them. Not definitely, but probably. They wouldn't be tempted to get rid of Rowley as much as they would Quintell.

"So that leaves Grendon. And if you read the papers, you'll know that he's pushing in already."

They looked at each other again. I knew they weren't necessarily working for Quintell; I was pretty sure it was Grendon, On the other hand, they might have told the truth so that I'd be sure to think it *was* Grendon. I didn't know how deep their subtlety went, and I didn't care. It didn't matter to me who they were working for.

"That sounds logical," said the colonel. "Very logical."

"But we have to know," added Mutton Chops. "We were fairly sure you'd head back towards the city; that's why we set up guards at the various street entrances. Since that part of our prediction worked out, we want to see if the rest of it will."

"The rest of it?"

"Yeah. You're expendable. We know that. The organization that sent you doesn't care what happens to you now, otherwise they wouldn't have let you loose like that. They don't care what happens to Eddie Gifford.

"So they must have known you'd get caught. Therefore, they've got you hypnoed to a fare-thee-well. And we probably won't find anything under the hypno, either. But we've got to look; there may be some little thing you'll remember. Some little thing that will give us the key to the whole organization."

I nodded. That was logical, very logical, as the colonel had said. They were going to break me. They could have done it gently, removed every bit of blocking and covering that the hypnoes had put in without hurting me a bit. But that would take time; I knew better than to think they were going to be gentle. They were going to peel my mind like a banana and then slice it up and look at it.

And if they were working for any of the Immortals, I had no doubt that they could do what they were planning. It took equipment, and it took an expert psychometrician, and a couple of good therapists—but that was no job at all if you had money.

The only trouble was that I had a few little hidden tricks that they'd never get

around. If they started fiddling too much with my mind, a nice little psychosomatic heart condition would manifest itself. I'd be dead before they could do anything about it. Oh, I was expendable, all right.

"Do you want to say anything before we start?" the colonel asked.

"No." I didn't see any reason for giving them information they didn't earn.

"O.K." He stood up, and so did the mutton chopper. "I'm sorry we have to do this, Gifford. It'll be hard on you, but you'll be in good condition inside of six or eight months. So long."

They walked out and carefully locked the door behind them.

I sat up for the first time and looked around. I didn't know where I was; in an hour, I could have been taken a long ways away from the city.

I hadn't been, though. The engraving on the bed said:

DELLFIELD SANATORIUM

I was on Riverside Drive, less than eight blocks from the rendezvous spot.

I walked over to the window and looked out. I could see the roof of the tenth level about eight floors beneath me. The window itself was a heavy sheet of transite welded into the wall. There was a polarizer control to the left to shut out the light, but there was no way to open the window. The door was sealed, too. When a patient got violent, they could pump gas in through the ventilators without getting it into the corridor.

They'd taken all my armament away, and, incidentally, washed off the thin plastic film on my hands and face. I didn't look so old any more. I walked over to the mirror in the wall, another sheet of transite with a reflecting back, and looked at myself. I was a sad-looking sight. The white hair was all scraggly, the whiskers were ditto, and my face looked worried. Small wonder.

I sat back on the bed and started to think.

It must have been a good two hours later when the therapist came in. She entered by herself, but I noticed that the colonel was standing outside the door.

She was in her mid-thirties, a calm-faced determined-looking woman. She started off with the usual questions.

"You have been told you are under some form of hypnotic compulsion. Do you consciously believe this?"

I told her I did. There was no sense in resisting.

"Do you have any conscious memory of the process?"

"No."

"Do you have any conscious knowledge of the identity of the therapist?"

I didn't and told her so. She asked a dozen other questions, all standard build-up. When she was through, I tried to ask her a couple of questions, but she cut me off and walked out of the room before I could more than open my yap.

The whole sanatorium was, and probably had been for a long time, in the pay of Quintell or Grendon—or, possibly, one of the other Immortals. It had been here for years, a neat little spy setup nestled deep in the heart of Rowley's territory.

Leaving the hospital without outside help was strictly out. I'd seen the inside of these places before, and I had a healthy respect for their impregnability. An unarmed man was in to stay.

Still, I decided that since something *had* to be done, something *would* be done.

My major worry was the question of whether or not the room was monitored. There was a single scanner pickup in the ceiling with a fairly narrow angle lens in it. That was interesting. It was enclosed in an unbreakable transite hemisphere and was geared to look around the room for the patient. But it was *not* robot controlled. There was evidently a nurse or therapist at the other end who checked on the patients every so often.

But how often?

From the window I could see the big, old-fashioned twelve hour clock on the Barton Building. I used that to time the monitoring. The scanner was aimed at the bed. That meant it had looked at me last when I was on the bed. I walked over to the other side of the room and watched the scanner without looking at it directly.

It was nearly three quarters of an hour later that the little eye swiveled around the room and came to a halt on me. I ignored it for about thirty seconds, then walked deliberately across the room. The eye didn't follow.

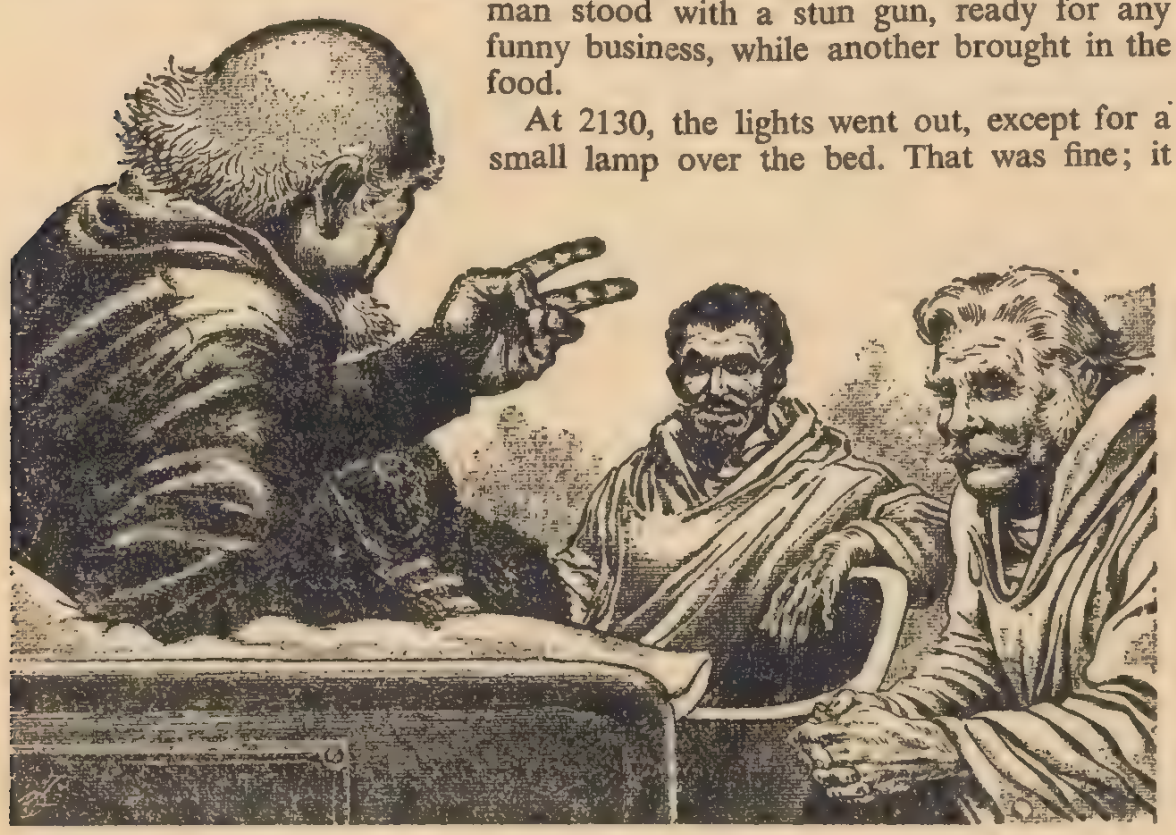
Fine. This was an old-fashioned hospital; I had known that much. Evidently there hadn't been any new equipment installed in thirty years. Whoever operated the scanner simply looked around to see what the patient was doing and then went on to the next one. Hi ho.

I watched the scanner for the rest of the afternoon, timing it. Every hour at about four minutes after the hour. It was nice to know.

They brought me my dinner at 1830. I watched the scanner, but there was no special activity before they opened the door.

They simply swung the door outward; one man stood with a stun gun, ready for any funny business, while another brought in the food.

At 2130, the lights went out, except for a small lamp over the bed. That was fine; it



meant that the scanner probably wasn't equipped for infrared. If I stayed in bed like a good boy, that one small light was all they'd need. If not, they turned on the main lights again.

I didn't assume that the watching would be regular, every hour, as it had been during the day. Plots are usually hatched at night, so it's best to keep a closer watch then. Their only mistake was that they were going to watch *me*. And that was perfectly O.K. as far as I was concerned.

I lay in bed until 2204. Sure enough, the scanner turned around and looked at me. I waited a couple of minutes and then got up as though to get a drink at the wash basin. The scanner didn't follow, so I went to work.

I pulled a light blanket off my bed and stuffed a corner of it into the basin's drain, letting the rest of it trail to the floor. Then I turned the water on and went back to bed.

It didn't take long for the basin to fill and overflow. It climbed over the edge and ran silently down the blanket to the floor.

Filling the room would take hours, but I didn't dare go to sleep. I'd have to wake up before dawn, and I wasn't sure I could do that. It was even harder to lay quietly and pretend I was asleep, but I fought it by counting fifty and then turning over violently to wake myself again. If anyone was watching, they would simply think I was restless.

I needn't have bothered. I doped off—sound asleep. The next thing I knew, I was gagging. I almost drowned; the water had come up to bed level and had flowed into my mouth. I shot up in bed, coughing and spitting.

Fully awake, I moved fast. I pulled off the other blanket and tied it around the pickup in the ceiling. Then I got off the bed and waded in waist-deep water to the door. I grabbed a good hold on the metal dresser and waited.

It must have been all of half an hour before the lights came on. A voice came from the speaker: "Have you tampered with the TV pickup?"

"Huh? Wuzzat?" I said, trying to sound sleepy. "No. I haven't done anything."

"We are coming in. Stand back from the door or you will be shot."

I had no intention of being that close to the door.

When the attendant opened the door, it slammed him in the face as a good many tons of water cascaded onto him. There were two armed men with him, but they both went down in the flood, coughing and gurgling.

Judging very carefully, I let go the dresser and let the swirling water carry me into the hall. I had been prepared and I knew what I was doing; the guards didn't. By turning a little, I managed to hit one of them who was trying to get up and get his stunner into action. He went over, and I got the stunner.

It only lasted a few seconds. The water had been deep in the confines of the little room, but when allowed to expand into the hall, it merely made the floor wet.

I dispatched the guards with the stunner and ran for the nurse's desk, which, I knew, was just around the corner, near the elevators. I aimed quick and let the nurse have it; he fell over, and I was at the desk before he had finished collapsing.

I grabbed the phone. There wouldn't be much time now.

I dialed. I said: "This is Gifford. I'm in Dellfield Sanatorium, Room 1808."

[*Continued on page* 113

THE DISTURBER

By WINSTON MARKS

***It takes** a kid to be the ultimate in absolute certainty that he's got the right—and only right—answer. That makes it a little hard to deal with one when he does have an answer. . . !*

Illustrated by van Dongen

BILLY, my sixteen year old, is never satisfied with the way things are. He's always trying to change them—or change people's ideas about them.

I remember the first argument I lost to him. He was ten, then, and he wanted to know why wheels were round. I said, "Because they have to be or they aren't wheels."

"You mean, *round is a wheel?*" he asked innocently.

"Of course," I said foolishly.

"Marbles are round," he pointed out. "Are they wheels?"

"Yes, but in a different way. They're spherical—round in three dimensions."

"Why is round so good?" he wanted to know.

"You wouldn't want to play with square-cornered marbles like sugar lumps, would you?" I asked.

"N-n-n-no—but why round wheels?"

"They go better," I said. "Less friction. Suppose the wheels on your wagon were flat on one side. You wouldn't go very fast, would you?"

He shrugged his little shoulders. "I dunno. That's why I was askin' you. If wheels make fer less friction, why don't I have wheels on my sled? It goes faster than my wagon."

He looked at my face and saw he wasn't about to get a satisfactory answer, so he went back to his lemonade stand to short-change some more customers and figure out how to get more profit out of a lemon.

Yes, business, finance and economics were Billy's first love. Science played second fiddle to his worm-digging, paper route and sundry ventures in selling things at a profit. Yet here, too, his habit of asking questions and refusing to be satisfied with the answers he got kept him in a constant state of rebellion that went well with his kinky red hair.

Gradually he learned to tolerate the "facts of life" in matters of scientific observation, such as the business of why not wheels on his sled. (He tried it and wound up with a broken nose.) But he was strictly a renegade in business.

He learned about borrowing and lending money at age thirteen. Instantly he wanted to know why interest rates were only two per cent when you loaned money to a bank, yet you paid six per cent when you borrowed from the same institution. "That sounds like lousy business for everybody but the bank," he

observed and wanted to know why two per cent and six per cent were the "magic" numbers.

I told him, "That's all the traffic will bear, either way."

"Nuts!" was his answer, and I should have known what was in his mind. Instantly he began investing the returns of his paper route in small loans to his fellow freshmen—at fifty per cent interest, payable next allowance day. This went on for two years before I accidentally got a peek at his bankbook one day, questioned him and uncovered his business in unregulated usury.

"It's illegal!" I roared at him.

"You never said that," he said big-eyed and unapologetic. "You just said people wouldn't pay more than six per cent interest. Heck, when these jokers got a date and they're broke, they pay fifty per cent without a squawk."

"And you collect within a week?"

"Yah. You got to keep them short-term loans," he explained. "You can't trust these monthly allowance boys."

"My dear Shylock," I said, "fifty per cent per week is actually twenty-six hundred per cent per year."

"Yeah," he agreed, "it figures out real good. That's how I got eight hundred dollars in the bank."

I managed to stop the loan business by threatening to turn him in to the Bureau of Internal Revenue and make him pay taxes. If there was anything he hated and deemed unjust it was the taxation of money, "which a guy earns himself and nobody got a right to steal it without giving something in return."

For a while he restricted his business activities to his paper route and began attending to the nauseous business of acquiring honor grades at school. In a way this was business, too, because he found out about scholarships, and he realized, since our means were limited, he would have to work his way through.

That is how he got back into science. Unfortunately, he became interested in philosophy at the same time and began reading library books. The more philosophy he read the more critical he became of his physics and chemistry. His acceptance of the desirability of the round wheel and the inalterable facts of gravity began to diminish.

"I really don't get it," he declared one night after dinner. He had his books and papers spread out on the library table, struggling to comprehend the immutability of the laws of vectors.

I peeked over his shoulder and hoped he wouldn't ask me any questions. It's been a lot of years since I crammed for exams, and Billy was getting up where my academic assistance was restricted to paternal encouragement and passive interest.

"Stuck?" I inquired sympathetically.

"Naw," Billy said. "The problem comes out nicely when you follow the book. Force A, ten pounds in this direction, Force B, five pounds at right angles, resultant, so many pounds in this direction."

"Then what don't you get, son?"

"Well," he took a deep breath, and that old rebellion came back in his eyes, "they represent force by a linear line—a straight line, and they make us assume that's the only way it can be represented."

"Isn't that logical?" As usual, his rejection of orthodoxy raised prickles of

BROWN & CARTER

resentment on my dogmatic hide. What was good enough to get papa a C in physics should be adequate for sonny.

"No, it's not. Of course, as long as you accept all their premises, it's got to work out the way they say. But suppose you used a curved line, or a broken line to represent the forces?"

"That's stupid," I told him. "Why make the problem hard just by using clumsy, artificial symbols?"

"Why make it easy, just so you always get the same old results?" he retorted.

Billy passed his tests and went on into the physics of motion, sound, light and electricity with a peculiar mixture of absorption and contempt. The stuff seemed to come too easily for him, and he was always deriding the "cut and dried" assumptions he was forced to swallow.

I found him staring at the little short-wave transmitter he was building one Sunday afternoon and inquired whether he was studying to pass his "ham" license.

He shook his head. "Just building it to test some of my own theories," he said. "Electronics is one field where the books are really haywire, but they won't argue with you in school. They ram their stinking old formulae down your throat, and it's supposed to taste good just because it looks good on paper."

"It works," I said.

"Sure!" He waved his freckled hand at the rough radio chassis on our basement workbench. "Solder here, connect there, tune the I.F. to 456 K.C., and you got a receiver. Turn it around, use a mike instead of a speaker, load the antenna and you got a transmitter."

"Just like baking a cake," I said.

"Yeah? Then why don't mother's cakes always come out the same?"

"Well," I struggled, not wanting to cast aspersions on Mary's cooking, "mother isn't a scientist. Sometimes she gets too much chocolate in it, maybe."

He looked at me funny. "Right! Mother's cakes got personality. I *like them* with too much chocolate." He turned to the chassis, up-ended it and began stripping out leads with a pair of long-nose pliers.

"What are you doing?"

"Giving this rig some personality," he said. He picked up his soldering iron and referred to some scratchy diagram notes at his elbow. "Putting in extra chocolate, let's call it."

I left him to his iconoclastic pursuit and forgot about the whole project until a month later I got a phone call from the FCC.

Billy was unrepentant. "So I forgot to shield a couple of leads? Did I kill anyone?"

He might as well have. When you ruin people's TV reception at seven o'clock in the evening they are very unforgiving. In order to avoid a fine I had to promise to make Billy dismantle his equipment.

He did. And rebuilt it.

I caught him one Saturday afternoon, pointing a stubby little dipole antenna out the basement window. The lead ran to the transmitter chassis which I had seen in parts only a week before.

"What," I yelled, "are you doing? Trying to get me thrown on the rock?"

"Just having fun," he said mildly. "The leads are shielded, and I'm transmitting on a different frequency, anyhow. Looky here, Pop." He pointed out over the sidelawn to the empty lot next door.

A dozen smaller youngsters were playing scrub baseball. Just as I looked, the batter cut hard at the ball and hit it squarely. The ball dribbled halfway to the pitcher and stopped, but the bat rebounded from the solid blow, and the boy barely managed to keep from knocking the catcher's head off. It was as if he had swung at a rubber tree trunk.

"There goes one of Newton's holy laws of motion," Billy exclaimed. He lay down the antenna and ducked so the kids wouldn't look back and see him.

"What in thunder—"

"Duck down," he said. "Don't spoil it."

"What have you done to that radio?" I demanded.

"It's not a radio any more," Billy said triumphantly. "It's a *disturber*."

"If it disturbs anybody's TV again you and the Federal Communications Commission can settle it between yourselves," I said nastily.

"I could, but I won't," Billy promised. "This is terrific, Pop. You know, all those gripes I got against physics?"

"Like vectors and moments of force?"

"Yeah. Well, I'm one hundred per cent right. They don't always work—or you can make them work according to different principles."

"What," I repeated, "have you done to that radio?"

"Not much. Just disproved the infallibility of Newtonian physics, Euclidean geometry and fourteen schools of philosophy," he announced proudly. "Everybody thinks certain so-called natural laws are rigid and unchangeable. This just isn't so, Dad! These laws are just instances of special cases, and scientists accept these cases as the rule. What tipped me off was this business of philosophy. Here we got dozens of famous characters all claiming to be right about things like the meaning of the universe and sin and morality and human behavior. Each one's got a school of thought with a lot to recommend it. But none of them got the final answer, and there will never *be* a final answer."

I bit. "Why not?"

"Because there is no final answer to anything—not even the laws of physics. Take this little rig I call a disturber. All I've done is express a few of my doubts about the electro-magnetic field theory, and what happens? I can louse up the 'laws' of inertia and motion at will. Watch this!"

A four-foot piece of kite-string dangled from a shingle nail driven into one of the beams overhead. He flipped it with a finger and it jiggled, rippled and swung like a piece of kite string might be expected to. Then he laid his stubby di-pole antenna on the bench just so, aimed at the middle of the string. It was still swinging like a loose pendulum. Just as it reached the top of its swing he touched a switch. The string froze at a ridiculous angle. He cut the switch off, moved to the string and leaned a hand against it. Then he shuffled his feet to one side so a good portion of his weight shifted to his outstretched arm and the string.

"Billy," I said swallowing, "what makes it so rigid?"

"Inertia," he said, pleased at my dumbfounded expression. "I claim inertia

is not solely a function of mass. It's also a matter of comparative polarity and relative comportance to the—"

"Whoa!" I said. "What's comportance?"

He frowned and rubbed his nose. "Well, it's a term I had to invent. Perfectly meaningful, though, just as good as impedance and reluctance and the like. It's the crazy juxtapositional factor that kept worrying me when we were studying vectors. Sure, you can represent moments of force with neat little straight lines if you ignore comportance, but the second you disturb the particular field we are used to on Earth, then the whole concept is screwy."

"But you turned off the gear," I objected. "This force field isn't operating any more, and you can still lean against the string."

"Oh, it's permanently oriented in its new comportance," Billy said. "Look!" He hung half his weight on the slanted string using both hands. Then he hooked a thumb out of the window. "And that bat out there. I did the reverse there. I reduced the comportance on it just as he hit the ball, so that bat, in effect, had about as much inertia as a match stick. It wouldn't have hurt the catcher if it *had* hit him. Of course, I changed the comportance back to normal right away again so they wouldn't catch on."

I didn't follow him, but I caught enough to make me sweat. "What would happen if you happened to hit one of those kids out there with this . . . this beam or force-field."

He read my face. "Now, Pop, I was careful. Besides, I reversed to Earth-normal right away again."

"Billy," I said sternly, "whatever you've got there sounds mighty dangerous. I forbid you to turn it on again—except in my presence."

"You mean you'll help me experiment?" His face lighted up. Fact was, I was so intrigued I found it difficult to be properly severe.

"Perhaps, a little, if you're sure it doesn't foul up TV."

"Oh it won't, I'm positive," he assured me.

I said, "What would it do to a golf ball?"

"Same as the string," he said, not catching on. I went upstairs and got an old ball out of my bag and brought it back.

"Here, reduce the comportance on this," I told him.

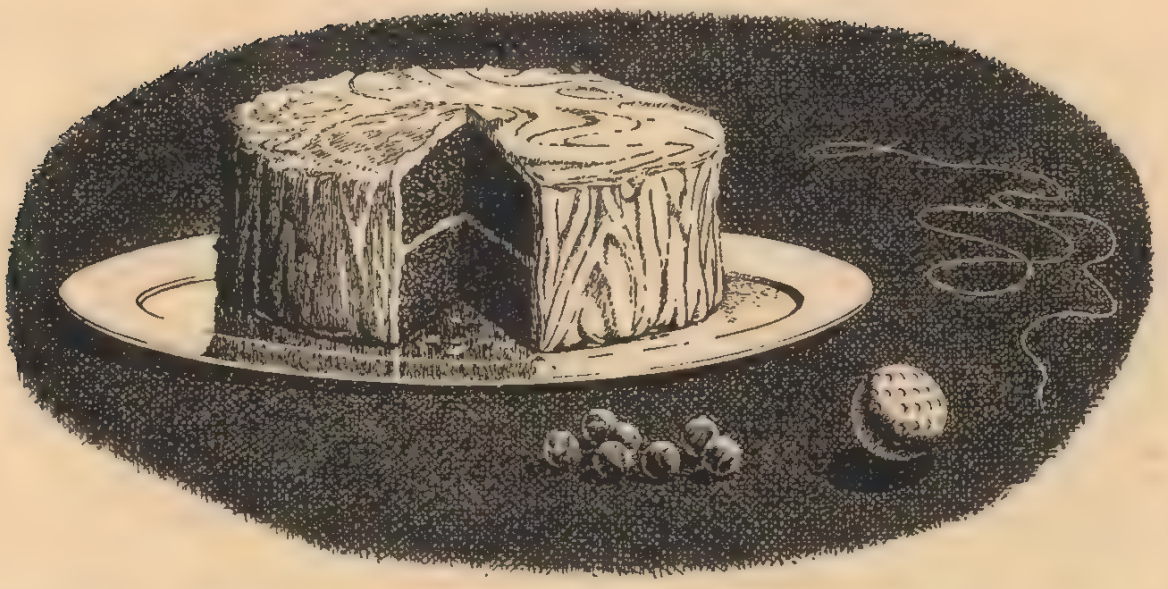
He looked puzzled, but he twiddled a dial, pointed the antenna and gave the ball a short burst. I picked it up and bounced it on the concrete floor. It was most disappointing. It was more like a ping-pong ball. "Man couldn't drive that," I objected.

"Of course not," Billy said. "Its relative comportance is too low compared to air. What you want is a little extra comportance." He took the ball, reset the dial, buzzed the ball for a good second and invited me to pick it up.

It's hard to describe the feeling. It was heavy, about five pounds worth, I would say. Only it wasn't exactly heavy. When I lifted it, it resisted my fingers with at least five pounds pressure, but when I got it waist-high and held it motionless in my hand it seemed to weigh no more than any golf ball!

It startled me so that I juggled it around and finally dropped it. It *floated to the concrete floor* like a big feather ball, hit with a sluggish thud and slowly bounced about three fourths back up in the air. Billy caught it with no trouble.

"You still don't understand, do you?" he asked. "Like I said, the inertia is



a function of its comportance, but increasing the inertia *does not increase its mass*. Therefore, gravity has greater difficulty pulling it down."

"But it's heavier!"

"Not really. On a static scale it would weigh just the same as it ever did," Billy insisted. "Only when force is applied in any direction does its greater inertia become apparent."

"Whoa! Back up!" I said. "If you increased the inertia without increasing the mass, this ball would fly off the face of the earth. It has a given velocity in a straight line tangent to the earth's circumference, the velocity of the earth's rotation. If you multiply its inertia along this straight line by about twenty, and yet leave the mass the same, gravity would be too weak to hold it on the earth."

I was sure I had him on this point, for the laws of motion had been my meat in physics. But he just stood there and grinned at me holding out the golf ball. After a second I caught on. If I were right, the ball would not be sitting there peacefully on his palm. "All right, I give up," I said. "What's wrong with my logic?"

"It just doesn't apply to comportance," he said, trying not to rub it in. "Remember? I said once that it might make sense to represent certain moments of force with a curved line? Well, that's where my geometry differs from Mr. Euclid and Mr. Newton."

I kept staring at that beat-up old golf ball and gradually the staggering truth soaked into my stubborn brain. My son, Billy, my offspring, my own issue—had refuted some of the most sacred laws of physics! The very bull-headedness in him that had always caused me so much worry had led him to one of the most important discoveries of the century.

It meant space flight! With diminished inertia, man was free to fly to the Moon, the planets—even the stars. As inertia was reduced to near infinity, a given thrust of rocket fuel would produce a velocity that would approach infinity!

My son! Little Billy!

"Do you realize the implications of what you've done?" I asked.

"Sure!" His voice was belligerent. "I've proved my point. All this guff they've been feeding me at school is so much hogwash. They know better, but they won't admit it."

"But *do they*, Billy? *Do they* know better?"

Billy refused to consider that he had uncovered anything new. He held to the view that the principle of the disturber was too elementary to remain a secret from real scientists. Trouble with Billy was that he underestimated his own rebellious mind. Yet, he was right even in this matter, at least partly right.

The phone was ringing, and Mary was out shopping, so I went upstairs to answer it. Then I called Billy upstairs. "I thought you said the disturber wouldn't bother TV any more."

"It shouldn't," he said. "The oscillator circuit is well above UHF ranges. Why? What's the scoop?"

"That was the local FCC office again screaming turn it off! We're about to have visitors."

"Hector! I'm sorry, Pop. I really don't see how it could happen."

I couldn't feel angry about it. What would a small fine be compared to the money and fame that would be coming our way. I could see the headlines: "BILLY HOOD UPSETS SCIENTIFIC WORLD!" I began worrying about patent protection. Suppose these people from the FCC stole our idea?

There was little time to ponder it. An old panel truck with worn lettering on it drew up in front. The sign read, "Acme Plumbing & Heating." A tall, thin man in bib overalls climbed our steps carrying a heavy tool box.

I answered the door and was saying that we hadn't called any plumber before I looked into his eyes and realized this was no plumber. He said, "It's about the phone call you just received. May I come in please?"

He was extremely polite, and his eyes had a peaceful boredom in them. Once inside he set down the tool box that did not *clank*, and he showed me a billfold thing with his picture and a big golden eagle insignia. "Who's the genius around here?" he asked mildly, his tone less sarcastic than the words.

Before I could apologize and introduce Billy, my son stepped forward and took care of that himself. "I'm William T. Hood. Why the plumber's get-up, and where's your search warrant?"

"Nice to know you, William," the bored man said. "If you insist, I shall wait out in the truck. I'm not here to search. I came to make initial contact and request that you do not activate your . . . your equipment again—for a while."

We were obviously under house arrest, and I could visualize police cars surrounding the block and cruising down the alley. I said, "We didn't mean any harm, officer. Did we louse up the TV pretty bad this time?"

"Not at all," he answered surprisingly. "I'm not from the FCC. Your radiation was picked up in Washington, D.C. this morning—"

"Washington?" I exclaimed. That was two hundred fifty miles away.

Billy said, "Don't tell me they homed in on me all the way from Washington!"

"They sent a copter down." He hooked a thumb out the front window. There *was* a windmill about a block and a half due south, hanging around at about three thousand feet.

It looked much more serious than I had dreamed. "What law have we violated?" I asked.

"None," he said placidly. "Just relax. In a few minutes a man will be here to tell you all about it. If you don't mind, I'll sit down and wait with you."

I nodded him to a chair and began to question him further, but he raised a hand. "I've told you all I know, and all I want to know. The plumber's truck outside will prevent any embarrassment from the neighbors."

We sat in uncomfortable silence for some half hour. I kept watching out the front window, but when the knock came it was at the back door. It was a middle-aged man in a wrinkled, brown business suit. He said, "I'm Alfred Turner. Government business. May I come in, Mr. Hood?"

The "plumber" was at my back. He stepped around me, flashed his identification and looked askance at Turner. The fat man fumbled inside his suitcoat and satisfied the plumber with a tiny business card which he did not show to me.

"This is the man we've been waiting for," the plumber assured me. He turned on his heel and departed. We went into the front room and sat down. Turner offered me a cigar and stared thoughtfully at Billy.

"Fine boy, Mr. Hood. Smart, too." He said it flatly, as if he would brook no contradiction. He blew out his match and dropped it carefully in the very center of the ashtray. "I assume that your son is a ham, and it was he who fiddled up the ether today?"

I nodded. He went on, "Billy, you are the first young man in the country to stumble onto the *g-null* effect. I want to compliment you on—"

"I didn't stumble onto it," Billy said. "I figured it out. You want to see my gear?"

"Not . . . just yet. I'd like to ask some questions first. How did you happen to . . . to be trying to figure this thing out in the first place?"

"See here," I interrupted, "we aren't subversive agents or anything. Billy just invented a piece of equipment, and we have the right of protection on it. We haven't applied for patents yet."

"I know you aren't subversives, Mr. Hood. We picked up Billy's first signal weeks ago—when we had the FCC pass on the complaint. His signal wasn't perfected then, and we hoped he wouldn't do any more on it, but we investigated your family at that time just to be safe."

Billy was still pondering his original question. "I don't know," he said. "I guess it was because I couldn't swallow all that malarky they peddle at school. I just got to thinking and experimenting."

Turner shook his head unbelievingly. "It's amazing! The *g-null* effect is less than a year old. It's the most top-secret development in the Federal files of classified material. Only five other men beside myself are even aware of its exact nature and here a high school boy turns up with—" he threw up his hands.

"Gee!" Billy breathed, "are you a real scientist?"

Turner nodded. "I guess you can call me that. I helped develop the effect, and I'm head of the project to investigate it. But my biggest problem right now is what to do with you. How would you like to come to Washington and work with us?"

Billy shook his head. "No thanks. I'm no scientist. I haven't even finished school yet."

Turner leaned forward. "We'll give you an education in physics you couldn't buy anywhere in the world," he said intently staring into my son's blue eyes.

Still Billy shook his head. "I know those government jobs. No real money in them. How much would they pay a kid like me?"

The question startled Turner. "Oh, we could manage four or five thousand a year out of our budget—to begin with."

The sum impressed Billy, but he frowned. "Doesn't make sense. You got the invention already, so you'd be just paying me to keep me shut up. Right?"

"You're a smart boy, Billy. We need bright boys like you in the government."

"Why?" Billy asked bluntly.

"Well, because—" Turner stared at the carpet for a long moment and failed to find the answer there.

Billy got tired waiting. "Government's too darned big now," he said. "You've known about my *disturber* principle for a year, you say, yet you're sitting on the information and letting the schools go on teaching garbage to kids who trust you and don't know any better."

"You don't understand, lad," Turner said. "This thing is fantastic! Why, it will turn the whole world of physics and mathematics upside down. No one knows what weapons will come out of it—"

"Could be," Billy said without interest. "But I want no part of the bureaucratic mess. Tell you what I'm going to do. I don't want a salary from the government, but I will sell you my disturber—on payments. Easy payments. Starting next fall when I go to college. Fifteen hundred dollars a year for four years—while I get through business administration college. In return I clam up and drop all my experiments."

That kicked off a wrangle that set my blood running cold. Turner accused my son of blackmail, and Billy wound up denouncing Turner, the government and the whole field of science as a bunch of dictators. If there had been any way for the government man to take us into custody without attracting attention, we'd have been behind bars by nightfall, but Turner finally realized the barrel he was over.

Billy got his agreement—strictly verbal—six thousand dollars to be paid in annual instalments until he graduates from the university. And Turner got the equipment in our basement, plus all Billy's notes and schematic drawings.

After the government man was gone I chided Billy for his sloppy deal. "How do you know they'll pay off?"

He shrugged. "How do they know I'll keep my trap shut if they don't pay off?" he asked. "I could have squoze a little more out of them, but then it would have looked like real blackmail, and they'd have figured some way to land us all in the clink—or worse yet, in a government job."

Like I said, Billy has a fair head for business, and it really is his first love. Next year he goes to the State university. Then to New York, he says. God protect Wall Street!

Me? Well, I'll tell you. I'm neither a scientist nor a business man. Turner made me a very interesting proposition, and as soon as we get moved down to Washington, I'll be the highest paid janitor in the country. Guess I'm just a bureaucrat at heart.

ACHILLES AND THE TORTOISE

This, gentlemen, *is a stiff dose of philosophical logic. This is, moreover, a three-part article. But there's one simple reason why this magazine should carry it; it is a rigorously logical attack on the problem of interstellar flight. It is an integrated attack on the problem of what that fine old "space-warp" or "hyper-space" means in specific physical-science terms. And it starts, necessarily, with the ancient question "What is motion?" If we are to escape Relativity limitations, we must start at a* more *fundamental level, not build up from Relativity.*

By GOTTHARD GUNTHER

It is probable that the problem of interplanetary space travel may be solved in scientific and technical terms with which we are already familiar. But the situation looks very different when we approach the question of interstellar or even intergalactic voyages. The distances involved are so gigantic that interplanetary methods will be useless, and so will be the logical and physical concepts on which they are based. The following article tries to present some novel concepts—implied by recent developments in mathematics and physical science—which seem to contain the solution to the problem how to cross Deep Space.

The ideas expressed in this article have grown out of a correspondence between John W. Campbell, Jr. and the author. Although Mr. Campbell has occasionally been referred to in the text, his share in the ideas expressed herein has been much greater. In fact there is hardly any side to the problem in the development of which he did not participate. So what he claims as his own should be recognized as such. The actual presentation, of course, is the exclusive responsibility of the author, and any errors thet might have occurred are solely his.

So you really know precisely what motion in space means? When you get behind the steering wheel of your car and travel from, let us say, New York City to San Francisco, you know exactly what you do? Well, let us admit that in a practical sort of way you should indeed know what you are doing. If not, then may God help the other road users. It is, however, a very different matter if we ask the question: do we know in exact theoretical and scientific terms what motion in space actually is and how it happens? The answer is a most emphatic No! It may seem strange that something so commonplace, something we do every day as long as we live, involves unsolved logical and scientific problems. But that is the case. It is still a complete mystery to us, what actually happens when a physical body moves from one point in space to some other point.

There is a reason for it. Nowadays we are finally beginning to know what

Matter is, and what basic laws seem to define its ultimate structure. But we have not the slightest idea what Space—the mere absence of anything "physical"—might mean. It stands to reason: as long as we cannot give even an approximate meaning to the general term "Space," it will be absolutely impossible to have even the haziest concept about what really does happen when a body moves in space from one point to another. If we try to explain it, we get entangled in contradictions and paradoxes—a clear indication that our present thinking methods are inadequate even to pose the problem.

This has been known since the times of ancient Greece, and the most famous exposition of the riddle that has been offered by the phenomenon of motion in space is Zeno of Elea's paradox of Achilles and the Tortoise. Achilles, the fastest runner that ever lived, cannot overtake the Tortoise, the slowest animal. Zeno's argument runs as follows:

Let AZ (see diagram across bottom) be the race track.

Achilles starts from A, the Tortoise at the same time from B. If we assume that the Homeric hero runs twice as fast as the animal, the inference seems inevitable that both racers should reach point Z at the same time; but such was not Zeno's conclusion. This famous philosopher argued that while Achilles covers the distance AB, the Tortoise reaches point C. That is halfway between B and Z. When Achilles arrives at C, the animal must have reached D, this time midway between C and Z. When Achilles is at D, that Tortoise must have gone to E. When Achilles passes E, the animal is necessarily at F. And when our hero is at F the Tortoise has again passed half the distance between F and Z and is, therefore, now at G, and so ad infinitum. It follows, so Zeno concludes, that Achilles can never overtake the Tortoise. And, incidentally, neither of the runners can ever reach Z.

The point of the argument is, of course, the influx of time. Whenever Achilles reaches a designated point it has taken him time to get there from the preceding one, and during this time lapse the Tortoise has moved on to the next—as the animal is in constant motion. And no matter how short the distance will ultimately become, some time must always elapse till Achilles may cover it, and during that time interval the Tortoise shall have moved away from the point the pursuer is about to reach.

There is only one possibility that Achilles may catch up with the Tortoise. If the Homeric hero would move with infinite speed and would, therefore, cover the distances between A, B, C, D . . . Z in zero time, then the Tortoise would have no time to get away from point B as soon as the race starts. The beginning of the race and its finish would be the same identical moment. In other words: there would be no race at all. But if there is a race—with finite speeds for the racers—no overtaking could ever take place.

We all know from the practical viewpoint of our everyday experience that Zeno's argument is sheer nonsense. But the baffling thing is, although it is contradicted by the commonest actions in everybody's life, Zeno's point is

logically unassailable. There is no technical flaw in his reasoning. He has indeed with his paradox touched *the* very problem of space and its relation to motion, and his argument indicates one of the deepest insights into the metaphysical structure of the world. Alfred North Whitehead once remarked: "I am fond of pointing out to my pupils that to be refuted in every century after you have written is the acme of triumph. I always make that remark in connection with Zeno. No one has ever touched Zeno without refuting him, and every century thinks it worth while to refute him." ("Essays in Science and Philosophy," New York 1947. p. 114.) Obviously none of these refutations has ever been final. Zeno's paradox is now more than two thousand years old and the discussion about its merits is still going strong.

However, in modern textbooks on logic and metaphysics the reader may frequently find a (mistaken) statement to the effect that the infinitesimal calculus has finally solved Zeno's problem. The argument usually runs as follows: mathematically speaking the paradox of motion in space resolves itself into a problem of limits. If our race track AZ = x, and Achilles' handicap AB = 1, then obviously we have

$$x=2.$$

But Zeno constituted an unending series AB + BC + CD + DE + EF + . . . with the stipulation that every given distance (except the first) is exactly one half of the preceding one. We, therefore, obtain for x the equation:

$$x=1+\tfrac{1}{2}+\tfrac{1}{4}+\tfrac{1}{8}+\tfrac{1}{16}+ \ldots \text{ ad infinitum}$$

The question now is: does the right side of the equation equal 2? If that is the case, then it is mathematically demonstrated that Achilles must overtake the Tortoise at point Z.

This is the moment when the concept of "limit" is introduced. It is a device which enables us to circumscribe the infinity of numerical terms which turn up at the right side of our equation for x by a finite operation*. The procedure involved was developed by the French mathematician Cauchy (1789-1857), and it shows that the right side of our equation is exactly 2. The "trick" of

* For the mathematically advanced reader some hints of the limit procedure are given. Our original equation for x is first reduced to the generalized expression

$$x_n=2-\frac{1}{2^{n-1}}$$

It is then shown that

$$\frac{1}{2^{n-1}}<E$$

(where E is the smallest given number) reaches its "limit" only for $n \longrightarrow \infty$

We therefore obtain $\lim_{n \to \infty}$

$$\frac{1}{2^{n-1}}=0$$

If we insert this value into our generalized expression we derive

$\lim_{n \to \infty}$

$$2-0=2$$

That means: x has the value 2.

Cauchy's technique is, of course, that he eliminates the Infinite, because we cannot think it, and replaces it with the notion "limit." This substitute term permits a rigorous mathematical treatment and produces a "solution" for Zeno's paradox.

Now let us have a closer look at this "solution." What does it really demonstrate? It proves in the most rigorous way that our common sense experience, that Achilles *does* overtake the Tortoise, is right. But we know that anyhow. And no person in his right senses ever doubted it. Not even Zeno himself! When he developed his famous paradox he meant something very different. Explaining it to his disciples he might have said: There is a trivial and everyday occurrence like motion in space. It is absolutely convincing to our senses, and nobody doubts its existence. Yet at the same time fact defies any attempt to *think* it in noncontradictory terms. The phenomenon of motion as such is positively unthinkable. And it is unthinkable because the concept of Infinity is involved. Think Infinity and you will have solved my paradox. But there is the rub: Infinity is unthinkable for human thought.

This shows us that the solution provided by modern calculus is no genuine logical solution. It detours the real difficulty, the problem of the Infinite, and replaces it by a different concept, the limit, which corresponds to our normal practical experience. It does not show us how to *think* the element of Infinity involved in the mystery of motion. It does exactly the opposite: it shows us how to avoid it. Zeno's original problem: what is it that creates an apparently insolvable paradox in our consciousness if we try to think "motion," has not been solved by the technique of calculus. This has been borne out by the history of calculus itself. Its first discoverers, Newton and Leibniz, tried very hard to exclude the concept of an infinitely small quantity from their mathematical procedures. However, they did not fully succeed. The validity of their methods was doubted, and the technique of calculus did not attain its full scientific rigor till the notion of Infinity was finally eliminated, and replaced by the more modest concept of "limit." The calculus was recognized to be incompetent to deal with problems of genuine Infinity and the very essence of Zeno's paradox remained unsolved.*

"So what?" the reader might ask. "Isn't it enough that we have a mathematical tool that can compute any sort of motion we might observe in Space? Computation is sufficient for all practical purposes. So why bother about mysterious metaphysical properties of Space, Time and Motion!"

I am sorry, but it is not as simple as all that. First, our computation methods are already insufficient, when we encounter a so-called three-body-problem. And then: what about interstellar travel? Existing and computable types of locomotion may be satisfactory for travel on this planet and even in interplanetary space. But they are decidedly unsatisfactory when it comes to bridging interstellar distances within reasonable time intervals. As long as we don't know anything about the structural properties of the so-called "continua"—Space *per se* is a "continuum" and so is Time—we cannot even ask the question

* Zeno's paradox deals with the notion of the spatial "continuum." And it was finally proved by Weierstrass in his example of a "continuous function" that the limit methods of calculus are insufficient to deal with the problem of actual infinity. (K. Weierstrass, "Erstes Beispiel einer stetigen, nirgends differentierbaren Function," Journal für Mathematik, IX, 1875.)

whether these as yet unknown properties might permit types of locomotion, as yet equally unknown, by which a body (a spaceship) might alter its own position in space. The idea of a "space warp," so frequently encountered in science fiction points in that direction. If something like it existed, it would be a "motion" measured in terms of something other than distance—or time-units. The only way to discover and explore physical possibilities that might lie in this direction is the analysis of the paradox properties of the Space- and Time-continuum. And these properties are structural characteristics of the Infinite. Therefore Zeno should be very much alive with us.

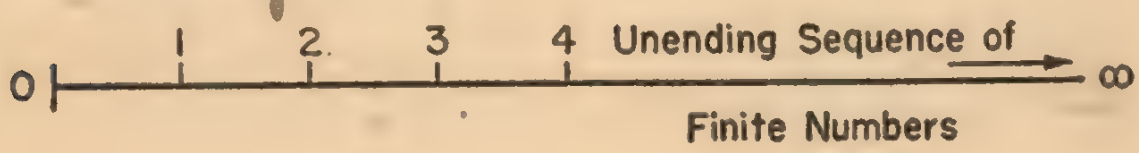
It is obvious that the failure to make Zeno's problem disappear was the failure of mathematics to develop a method to deal with the Infinite. The Infinite was just the limit of our numerical conceptions. We could approach, but never reach it, and within its realm all operational procedures broke down. Infinite plus one was Infinite. Infinite plus a million was Infinite, and Infinite plus Infinite still was nothing but Infinite. In other words: Infinite was the absolute limit for the counting process and, therefore, the limit-concept of quantity in general. This was what children learned in school, and it was also the limit of wisdom for the accomplished mathematician.

All this was changed, overnight so to speak, by the work of one man who ranks equal with the greatest in the history of mathematics. His name was Georg Cantor (1845–1918). He was born in Russia, lived the greater part of his life in Germany, and died as professor of mathematics at the University of Halle (Germany). During the final quarter of the last century Cantor published a series of articles which completely revolutionized our concept of number, of counting, and generally of quantity. In these articles Cantor transcended the concept of limit, thus ultimately bringing the very concept of Infinity within the grasp of mathematical technique.

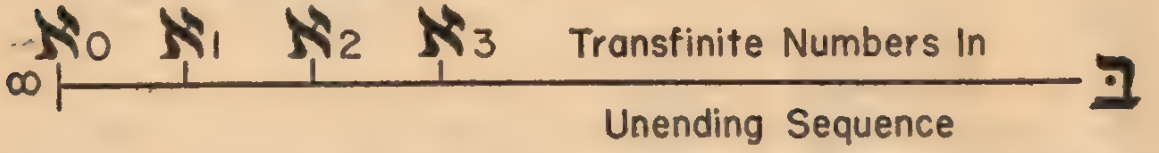
Cantor's results are so startling, nay, so unbelievable and fantastic for the normal mind that they were first attacked by mathematicians from every quarter. Today they are basically accepted, and they have led to a most radical overhauling of the foundations of traditional logic as well as classical mathematics. What Cantor has discovered can be summarized by the following statement: We are in error if we assume that the process of counting is limited by the concept of the Infinite—and that Infinite itself has no definite quantitative properties. It is, on the contrary, possible to count *beyond* Infinite and to construct an unending series of numbers, the smallest of which is our traditional concept of Infinite. Any subsequent number in this series is of higher arithmetical magnitude than mere Infinite. Cantor called these numbers which are of higher numerical power than the mere limit-concept of Infinite the transfinite numbers, or transfinite sets.

In other words: Cantor distinguishes two structurally different types of numbers. The first group are our familiar numbers which designate finite objects and relations.

Finite realm of counting:



The second group comprises the
Transfinite realm of counting:



In order to designate these transfinite numbers Cantor used the first letter of the Hebrew alphabet, Aleph, with a numerical index. His numbers are, therefore, called the Aleph-numbers, or short: the Alephs. They begin, as our figure shows, with $\aleph_0$, or Aleph zero (sometimes called Aleph naught), which is the *completed* traditional Infinite, and ascend from there to higher and higher numerical powers of the Transfinite and finally converge against a transfinite limit $\beth_1$.* In order to understand the fantastic orders of magnitude which are implied in the transfinite realm of counting one should realize that, if $\aleph_0$ is the completed traditional order of Infinite, then $\aleph_1$ is a number which represents the infinite power to the traditional infinite.

Now, if a mathematician makes the unheard of claim that he has discovered a new type of number series by dint of which he can determine differences of magnitude within the Infinite he is, of course, under obligation to explain how his new concept of number differs from our familiar finite numbers. Cantor's explanation is very simple and can be understood without any specific mathematical training. We have to make only a few preliminary steps.

First, we ask, what do we do when we count? The answer is: we establish a one-to-one correspondence between a group of objects and a second group of numerical concepts. Let us, for instance, count the letters in the word "universe":

u	n	i	v	e	r	s	e
↑↓	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓
1	2	3	4	5	6	7	8

Our double-headed arrows indicate the one-to-one correspondence between letter and number, and we see that the *cardinal number* which determines the quantity of letters used in "universe" is eight. In other words: "8" represents a set of integers which is equivalent to the number of letters in our word. Of course it is obvious, if we call "8" a set of integers, then "1," "2," "3," "4" . . . are sub-sets of our original set. And as we have counted letters or could count apples, horses, cars or ideas, we might as well count any such sub-set.

Let us take for instance the sub-set "4" and count it with our original set:

1	2	3	4				
↑↓	↑↓	↑↓	↑↓				
1	2	3	4	5	6	7	8

* For the idea that there should be an ultra-transfinite limit to all Alephs I am indebted to John W. Campbell. In a letter to me, of July 7, 1953, he calls it the transfinite number of "the non-denumerable space of *imagination*." In deference to his interesting ideas on this subject I have given our symbol for the transfinite limit the index "i." The symbol itself is the second letter of the Hebrew alphabet: Beth.

Everybody can see that the result is not a one-to-one correspondence between our counting numbers (below) and our counted objects (set "4"), but a one-to-two correspondence. There is no equivalence between our counting numbers and the counted set. We discover here the basic logical characteristic of all finite numbers which can be expressed as follows:

No finite number set is equivalent to a proper sub-set of itself.

This maxim holds unconditionally for the finite realm of counting and its application tells us that a certain number in question is finite. But what is obvious for the Finite is false for the Infinite!

In order to understand what follows, please let me remind you that the numerical magnitude of a counted set is always established by a one-to-one correspondence with a counting set—as it was the case with the letters of "universe" and the set "8." Now turning to infinite sets it would seem that the set of all positive integers (even *and* odd) should be of higher numerical magnitude than the set of all even numbers. We again apply our system of pairing the counted (above) and the counting numbers:

No matter how long we continue our pairing—and we assume it to be an unending series—we shall never run out of counting numbers, but we shall also never exhaust the series of even numbers which we want to count. Of course, the class of even integers is "thinned out" as compared with the class of all integers, but this "thinning out" has not the slightest effect on the order of numerical magnitude for the "thinned out" series. Such is the nature of even the lowest form of infinity!

To drive this most important point home I shall give you two more examples of such "thinning out" processes and their one-to-one correspondence with our unending series of integers:

The counted series in this case are the cubes (1^3, 2^3, 3^3, . . .) of the integers—and again we shall never run out of counted numbers as little as of counting integers, Both series of of equal numerical magnitude, because both converge against the same infinite limit.

As our last example we might finally stipulate that only such numbers shall be counted which begin with a "1," an odd number of zeros following:

No matter how radical our "thinning out" process is, the unending series above our double-headed arrows can never be exhausted by our counting integers. In other words: there are "as many" numbers in the series 10, 1000,

100000, . . . as there are in 1, 2, 3, . . . This seems to be the height of absurdity, but it is the inevitable logical consequence of the process we applied when we counted the letters in the word "universe."

It is now possible to state exactly what we mean if we call a set of numbers infinite. We defined a finite set as one which is not equivalent to a proper sub-set of itself. And we now say:

Any set that is equivalent to a proper sub-set of itself is infinite.

And this Infinite is the first number of Cantor's set of transfinite Alephs. It is the $\aleph_0$ of the transfinite realm of counting.

The next problem, of course, is how to proceed to our next transfinite number which should be "bigger" than our traditional Infinite. It is not too difficult to do so. Before we even begin to construct the next transfinite Aleph we can deduce what basic logical property it should have. The following table of properties, common and not-common to finite and infinite sets, should help:

type of set	special characteristic	common characteristic
finite	non-equivalent to sub-sets	denumerable
infinite	equivalent to sub-sets	denumerable

This table shows the logical situation at one single look. Finite and infinite sets differ as to their equivalence characteristics, but they are both *denumerable*. That means, there is always a method of counting the members of the different sets. And the method is the same. It stands to reason, if we want to find a third type of numerical set which differs from the finite as well as the infinite, this third type will have to negate what is *common* to its predecessors. To word it positively: the next transfinite number will have to be *non-denumerable*.

To obtain an expression for a non-denumerable Aleph let us do some transfinite arithmetic. It bears, as you will see, very little resemblance to that of the finite numbers.

$$\text{Addition:} \quad \begin{aligned} \aleph_0 + 1 &= \aleph_0 \\ \aleph_0 + \aleph_0 &= \aleph_0 \end{aligned}$$

$$\text{Multiplication:} \quad \begin{aligned} 2 \cdot \aleph_0 &= \aleph_0 \\ n \cdot \aleph_0 &= \aleph_0 \end{aligned}$$

(where n represents any finite number)

$$\text{Also:} \quad \begin{aligned} (\aleph_0)^2 &= \aleph_0 \cdot \aleph_0 = \aleph_0 \\ (\aleph_0)^n &= \aleph_0 \end{aligned}$$

There seems to be no variation in the result of these operations, but it is all very deceptive and treacherous. Because the result is quite different when we try:

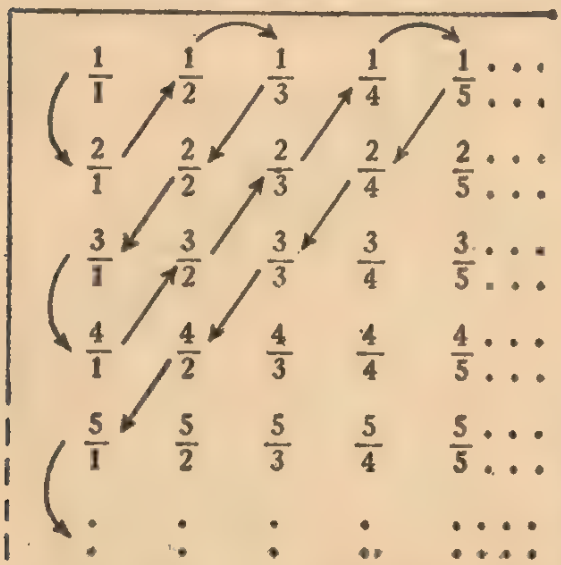
$$(\aleph_0)^{\aleph_0}$$

This operation creates a new transfinite number of higher numerical magnitude than the first number of Cantor's series. This second Aleph number is non-denumerable.

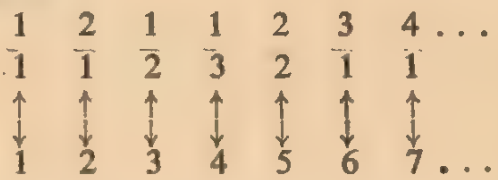
But what does non-denumerability actually mean? We shall find out by

following some of Cantor's trends of thought. Common sense tells us that there are more fractions than integers; for in between any two integers there is an *infinite* number of fractions. Alas—common sense is amidst alien corn in the land of the Infinite.

Although the rational fractions have no definite neighbors Cantor discovered a simple but elegant method to count them, thus proving their denumerability. He arranged the set of all rational fractions not in order of increasing magnitude (that is impossible), but in order of ascending numerators and denominators in the following array:

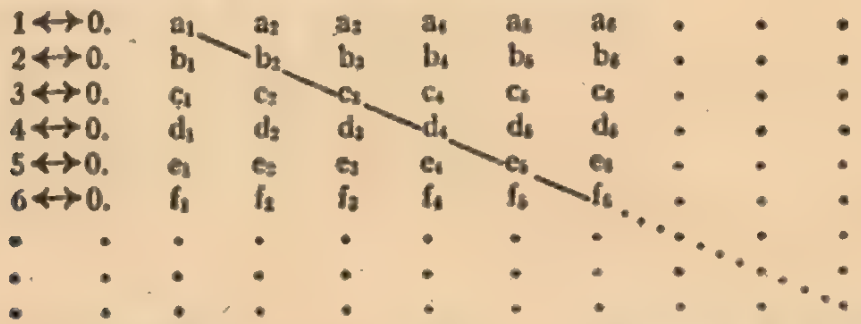


Now the familiar one-to-one correspondence with the integers—necessary for the process of counting—may be effected.



It follows: the number of all rational fractions is denumerable, hence also of the order of magnitude of $\aleph_0$. It may be hard to believe that there are "only" as many rational fractions as there are integers, especially in view of the fact that there are an infinite number of fractions between any two integers, but such are the mathematics of the infinite. Even with adding all rational fractions to our previous concept of $\aleph_0$ we have not yet left the arithmetical dimension of denumerability. However, Cantor's greatest triumph came when he could show that the class of rational plus irrational numbers—i.e. of the so-called real numbers—is of a higher order of magnitude than the denumerable $\aleph_0$. The class of real numbers is non-denumerable.

His proof is based on a *reductio ad absurdum*. He assumed that the real numbers between 0 and 1 were countable and could be paired with the integers. All real numbers can be expressed as non-terminating decimals, and Cantor wrote them down in the following array for counting:



If this array (where $a_1\ a_2 \ldots$; $b_1\ b_2 \ldots$; et cetera, are ciphers of the series 0, 1, 2, ...8, 9) is unending in horizontal as well as in vertical direction, it should contain *all* real numbers and thus be denumerable. But just the

opposite is the case. This array exhibits the very contradiction to the arguments that all sets are denumerable. For, no matter how our non-terminating decimals are actually arranged, it is always possible to find an infinity of other decimals which are not present in the array . . . *although the same is infinite.* The question is: how can we determine such omitted decimals? One might argue: as this set-up is unending and we can actually count only a finite number of individual decimals, the ones we claim to be omitted might still turn up in the as yet uncounted infinite reaches of our array. Cantor countered this argument by the discovery of his famous "diagonal procedure." This technique permits us to show that there are real numbers which are not represented in our arrangement.

Please take another look at the array of the decimals. You will find that the ciphers

$$a_1 \qquad b_2 \qquad c_3 \qquad d_4 \qquad e_5 \qquad f_6 \ldots$$

are connected by a diagonal line. If we now construct a second decimal fraction (with Greek letters)

$$0, \qquad \alpha \qquad \beta_2 \qquad \delta_3 \qquad \varepsilon_4 \qquad \epsilon_5 \qquad \eta_6$$

where α, differs from a_1, β_2 differs from b_2, δ_3 differs from c_3 and so on, then this new number differs from all the unending decimal fractions in our original set in just one place. It differs from the first number in our table in the first place, from the second number in the second place, from the third number in the third place and generally from any nth number in the nth place—no matter how far toward the Infinite we may place n. It is, therefore, impossible that our "diagonal number" may turn up in the as yet unexplored reaches of our array. The diagonal number is, therefore, a real number between 0 and 1 *not* contained in our denumerable array.

It is further possible to repeat this procedure an infinite number of times by starting with a_2, a_3, a_4. . . . or b_1, c_1, d_1 . . . thus creating not only one but an infinite series of "diagonal numbers." It is herewith demonstrated that the set of all real numbers between 0 and 1 is non-denumerable and, therefore, of higher arithmetical magnitude than the denumerable Infinite. And since the same can be demonstrated for the set of all real numbers between 1 and 2, between 2 and 3, between 3 and 4, and so forth, it follows that the set of all real numbers is also non-denumerable.

If this is the case, we must for the first time in the history of human thinking admit logical distinctions within the realm of the Infinite. Because at least two different types of the Infinite have been determined: the denumerable order of the Infinite and the non-denumerable order which is of higher arithmetical power. As the set of the real numbers designates the so-called continuum, Cantor called the transfinite number which represents this set: the transfinite cardinal number c. By some further proof Cantor could show that the cardinal number of all univocal real functions, f, is even of higher transfinite order than c. Thus we already possess three Alephs. The Aleph of the classical Infinite which produced Zeno's paradox, the Aleph of the continuum and the Aleph of the univocal real functions.

The arithmetic of c is very much the same as that of $\aleph_0$. It is interesting and

significant that when c is combined with $\aleph_0$ it swallows the latter completely. Thus we have:*

$$c+\aleph_0=c$$
$$c-\aleph_0=c$$
$$c \cdot \aleph_0=c$$
$$c \cdot c_0=c$$

Even the following equation holds:

$$c^{\aleph_0}=c$$

But the result is different in the next case:

$$c^0=f.$$

We pointed out before that the number of transfinite Alephs is infinite. Thus f is by no means the highest numerical concept we may conceive. We do know that there exists an unending series of higher Alephs that converges towards "Campbell's limit," because it can be proven that the set S of the sub-classes of any given class C always possesses a higher cardinal number than C. That means in the case of our number f that the set of its sub-sets is of higher transfinite order than f itself.† This process can be continued ad infinitum. So much about Cantor's daring creation.

The next instalment of my article will show that Cantor's theory of the transfinite cardinal number c, the Aleph of the continuum, provides a genuine solution to Zeno's paradox. More than that, Cantor's deductions provide an access to an entirely new concept of Space and to a mathematical basis for interstellar space travel. Some of the conclusions about the structural properties of Space, Time and Matter to be drawn from the theory of the Alephs are so startling and so absolutely beyond our present thinking habits that I cannot resist the temptation to finish this article with the statement, that interstellar travel will be possible the very day Achilles *really* overtakes the Tortoise. So far he does so only within an independent context of Nature—and against the anguished protest of our too limited powers of thinking. But the day of interstellar space travel will be here when Achilles overtakes the Tortoise in our thoughts as well as in Nature. In other words: when we have unraveled the secret of motion. The two following instalments of this article have been written with the intent to bring this day nearer.

* Aleph naught is usually represented in transfinite arithmetics by the letter a. Mathematicians are in the habit of writing: $c+a=c$, etc. I have retained $\aleph_0$ in order to indicate that the Aleph order of the denumerable Infinite is established but not the transfinite magnitude of c.

† The principle of this transfinite induction can be illustrated by a very elementary example: Let the set A contain only the three integers 1,2,3. The cardinal number of our set is 3. However, the sub-sets of A (including the null-class) are (0), (1), (2), (3), (1,2), (1,3), (2,3), (1,2,3). Count them and you will find that the cardinal number of the set S of all the sub-sets is 8.

(To be continued)

PYRAMID

By ROBERT ABERNATHY

__One__ who thinks in terms of balanced ecologies can be thrown way off on his calculations—if he imports a species not properly a member of that ecology!

Illustrated by van Dongen

THE specially trained snig snuffed Earth's air greedily, blunt head weaving as it shuffled along the sparsely wooded hillside. It made little interrogative noises as it cast about for a scent.

Those who had trained it for its present task trudged after it, fretting beneath a noonday sun a little hotter than their own. They were thagathla—beings six-limbed like the snig to which they were kin, but with crested heads carried erect and forelimbs that ended in clever fingers instead of the snig's shovellike digging paws. One of them wore the communicator which kept them in touch with their scout ship, out of sight beyond tree-grown ridges; another carried a gas gun; the remaining one, whose name was Zilli, was a junior biologist with a future. Since she was the only scientist in the landing party, Zilli was its ex officio leader.

All three thagathla were tense and watchful. Unless the maps were wrong—the old charts resurrected from the Interstellar Museum on Thegeth, where they had moldered since the First Earth Expedition four hundred years earlier—here was the home ground of the enemy whom this, the Second Expedition, had come thirty parsecs to seek.

The thegethli in the lead clucked and pointed. Still following the questing snig, they had reached the hilltop. In the swale beyond, half-hidden among verdure that grew dense along a little stream two hundred yards away, rose a dozen or more roughly conical structures, apparently fashioned of skins or fabric stretched upon poles. In the brush they glimpsed flickers of motion, heard rustlings; then everything was still, but the thagathla sensed concealed eyes watching them.

"Well, Zilli?" the one who had pointed demanded. "What will those be?"

The biologist hesitated, reviewing in her mind the records she had studied. She said judicially, "Evidently shelters built by the bipeds that the First Expedition reported as the dominant species over most of the planet—though their presence in this region wasn't mentioned; they must have migrated here since then. Probably not dangerous, keep your eyes open—"

An ecstatic moan from the snig focused the party's attention once more. The squat shovel-footed creature had halted in its prowling along the farther slope, sniffed loudly at the earth in the lee of a projecting boulder, and all at once began to dig prodigiously. The thagathla clustered expectantly round it.

The snig paused, moaned eagerly again, and its blunt head darted forward in

a surprisingly quick strike. It backed out of its excavation and, with head held high and its prey squirming in powerful jaws, trotted proudly back to Zilli.

The biologist accepted the find, which promptly bit her; she got a safer grip and held it up for close inspection. Beady eyes glared at her from a round furry head with bulging cheek-pouches, attached to a plump tawny body that ended in a stubby tail. The hamster kicked and squeaked, then, deciding that all was lost, curled itself into a ball.

Deliberately Zilli checked point by point of the little animal's external features. At last she nodded with quiet satisfaction to the thegethli carrying the radio. "All right. You can tell them this is it."

The crew member began talking into her microphone. Back to the scout ship, thence to be relayed to the interstellar mother vessel out in its orbit, went the word: word that contact had been made with the enemy, that formidable foe which had overrun all Thegeth, undermined its economy and depleted its resources, and even now gnawed with innumerable rodent teeth at the very foundations of Thagathlan civilization.

From the scout ship came acknowledgment. "Right—we're on our way."

Zilli was busy stowing the captured hamster in a perforated specimen case, when the snig bounded up with a mournful cry of warning. Zilli spun round and ducked, barely in time; an arrow went past her with a vicious *whick!* and glanced from a tree trunk and skittered off down the hillside.

The thegethli with the gas gun crouched low and pointed her clumsy weapon. Shells burst with hollow *plops* in the brush on the hillcrest; from up there came thrashing sounds, then silence fell again. In the thicket by the stream below rose a whimpering cry, abruptly stifled.

Cautiously the thagathla trotted up the slope, circling upwind to avoid the gas which, specially compounded to produce anaesthesia in Terrestrial organisms, would have had considerable effect on the closely similar Thagathlan body chemistry.

The would-be attackers, four of them, lay sprawled, breathing stertorously, where the gas had overcome them. They were clad in roughly-prepared animal skins, and the spears and arrows which they had caught up to defend their homes against the invaders from the stars had points of polished stone.

Zilli eyed the new specimens with interest. From her point of view, their structural resemblances to the hamsters were striking, but so were differences—after sheer size, of course, their adaptation to an upright gait. Their virtual hairlessness pointed to a tropical origin, their artifacts to marked intelligence. It would be intriguing to investigate these creatures further.

The scout-craft came coasting over the treetops and descended toward the waiting group. The hamster imprisoned in Zilli's specimen case stirred and chittered. Recalled to the fact that she was not here to indulge idle curiosity, Zilli sighed and turned toward the ship—and then it was that Zilli had her great idea: an idea which, if it worked out, would make her renowned back home on Thegeth and bring certain promotion. She jerked round and stared fixedly again at the stunned natives, who were beginning to groan and move a little.

The communications operator approached from a hurried conference with

the crew of the scout. She said breathlessly, "The coördinator requests a more detailed report."

"Tell her—" Zilli hesitated, then recklessly cast the die. "Tell her that we are making rapid progress. Not only have I confirmed the presence of the enemy"—she tapped the specimen case at her side—"but I have already found a potential weapon against it!"

Her Fertility Mnigli was eight hundred years old; she had outlived twenty generations of the short-lived males of her species, and her title-of-address had become purely honorific. Her skin hung loose and her crest was green with age. She was an ecological coördinator, the Thegathlan equivalent of a senator, an elector, and a cardinal archbishop; so her tone with Zilli, a mere junior biologist, was abrupt.

"These are specimens of your proposed control?"

"Yes, Your Fertility," said Zilli. She watched respectfully as the coördinator paced slowly round the huddled group of a dozen captive humans. Their number had been augmented since Zilli had on her own initiative ordered the crew to beat the bushes along the brook. Zilli was taking no chances of losing the credit for her inspiration.

Mnigli surveyed the prisoners with shrewd old eyes, behind which her brain was making agile inferences from physical structure to probable habits and place in an environmental complex. Mnigli was not an ecological coördinator for nothing.

"You have both males and females here? How do you tell them apart?" Zilli pointed out the differences. "Hm-m-m," said Mnigli. "Little sexual dimorphism; a primitive trait—Disregarding the number of limbs and other superficial features, they look much like overgrown thrin."

Zilli agreed nervously. The thrin were arboreal carnivores of middling intelligence, whose function on Thegeth was to control the proliferation of several species of slothlike foliage-feeders. "But these," Zilli pointed out, "built their shelters on the ground and are clearly evolved for life there. Observe their feet, Your Fertility. Also, the teeth indicate an omnivorous diet—"

"We should have, then, to consider primarily their possible effect on the forest-floor community. As you know, Biologist Zilli"—the coördinator's tone sharpened—"our a priori estimate of requirements envisaged something like a small carnivore, capable of entering rodents' burrows; no doubt some such forms exist on Earth. What makes you think these hulking thrinlike creatures would make a better control—or do you?"

"I do," said Zilli stoutly. "The First Expedition reported this species to be the dominant one, at least on a basis of range—it being found all over the planet and thus evidently in successful competition with all other land animals. That fact bears witness to a high degree of adaptability—an invaluable characteristic in any life form to be transplanted to an alien environment. Carnivora, on the other hand, are notoriously delicate in an ecological sense, being highly specialized. Remember what happened to the wugud."

The coördinator remembered all too well; the incident alluded to had come close to wrecking her career along with that of several others in high places. The wugud, a flesh-eating ophidian species, had been deliberately imported from one of the worlds of Altair because it was a natural enemy of certain

Altairian vermin accidentally introduced on Thegeth. The wugud, unfortunately, was possessed of an undiscriminating voracity which had led it to find cannibalism much simpler than learning to locate its natural prey in a new habitat, with the result that the end of its existence on Thegeth had resembled the fate of the lamented Kilkenny cats. The thagathla had been forced to dispatch another expensive expedition to Altair in order to locate a more suitable control agent.

It would not do to have any more such mistakes. Fitting out the present expedition had thrown a severe strain on Thegeth's economy; no planet could long afford the cost in energy and materials required for interstellar travel. Recognition of that fact was one reason why the Thagathlan Ecological Bureau had banned such exploration four centuries earlier—that, and belated realization of the ecological havoc such contacts with other worlds could create. The hamster plague was one such fruit of folly; a mere handful of the Terrestrial rodents, carried home with them by members of the First Earth Expedition who fancied them as exotic pets, had run wild on Thegeth and, in the absence of any natural enemies whatsoever, had bred so mightily as to threaten the bionomic stability of the whole planet. It was that problem which the Second Expedition must solve by finding and bringing back some Earthly natural enemy of the hamster. And, old Mnigli told herself, in this case there must be no error; all avenues must be thoroughly explored.

She turned back to the cluster of humans and looked at them long and hard, as if trying to envisage in every detail their possible future as a factor in the ecology of Thegeth. They stared back at her with awed and fearful eyes, in which, perhaps, she was a god or demon. Mnigli sighed. "You may be right, Biologist Zilli; your reasoning does credit to one so young. You may proceed with the study of this species as an individual project, and prepare a report on its potential utility."

"Yes, Your Fertility."

"As conductor of a research project, you may assume the grade of senior biologist."

"Yes, *indeed*, Your Fertility!"

The final conference was held aboard the mother ship. The assembled scientists of the expedition listened silently to reports by the biologists assigned to study the possibilities of the local weasels and of a variety of hunting cat. At last Zilli's turn came to speak, and she rose to the occasion energetically.

"Colleagues! I am here to present the case for a species very different from and in all ways superior to those hitherto discussed—to wit, *Pseudothrin terrestris* Zilli!" This was formality; at one time or another during the past weeks the others had all dropped by the stockade where Zilli's research project was being carried on. "And I think you will agree with me that there is no need for long deliberation. We are all eager to return to Thegeth—"

"Spare us the oratory," said Mnigli dryly from the head of the council table.

Zilli inclined her head submissively, conscious that her remark had told; those present were scientists, but they were also thagathla, and after six weeks of brawling, undisciplined Earth they were heartily homesick for the ordered peace of their native world. If any of them had ever questioned the wisdom of the interdict on interstellar exploration, personal experience had disabused them.

"I shall produce," said Zilli, "facts and figures to show that *Pseudothrin* is far more intelligent than the wold cat, and at least as bloodthirsty as the weasel —in short, that we could comb this planet for years without uncovering a better pest-control agent."

She went on into technical details of her observations of captured humans and of their societies in a wild state, pointing out particularly that it had been found that they would prey on the hamster population not only for food but also for garments to protect their own hairless skins; there was no danger that their depredations would be extended to native fauna on Thegeth, in view of the same differences in protein metabolism which had prevented any native Thegethian flesh-eater from acting as a check upon the hamsters. Finally, the species was markedly intelligent; judging, in the absence of any commensurable tests, by their technological level, they would rank somewhere between the forest thrin and the agricultural zgi in that regard. Their intelligence was assurance that the thagathla could depend on them to be effective in performing their proposed ecological function.

Mnigli said dubiously, "There is a flaw in the last argument. Intelligence is a two-edged blade—and these creatures are omnivorous."

Zilli met the coördinator's gaze squarely. "You mean—what assurance do we have that they will not, instead of preying on their verminous relatives, find it easier to emulate the latter and make inroads upon the crops of the zgi—inroads which would be the more dangerous because of the cunning *Pseudothrin* is capable of?"

"That," said Mnigli, "is the crucial question." The other scientists rotated their heads energetically in agreement.

"I am prepared to answer it. In the first place, though omnivorous, they definitely prefer meat to vegetable food when they can get it. Furthermore, their large size would make it possible to employ against them countermeasures which have proved ineffective against the hamster infestation. And finally"—Zilli paused impressively—"my researches have shown that *Pseudothrin* has a well-developed language, of which I have already compiled a partial vocabulary. Your Fertility, colleagues—do you see what that means?"

There was a buzz of excitement and approbation which told Zilli that she had as good as won. Swelling inwardly with triumph, she raised her voice to drive the point home:

"It means that we have here, not an ordinary animal whose reactions are fixed by instinct, but one whose behavior can be tailored to our needs. We can implant verbal-cultural directives, as we have done with the zgi and to a lesser extent with the thrin. Impressing these directives on a few thousand initial importees will be simple, and with a minimum of intervention on our part these will have the force of tradition even when the descendants' numbers shall have increased to millions—"

Morg, the hunter, strode easily through the open woodland beneath fronded trees that would have seemed very strange to his great-grandfather several times removed. The same great-grandfather would also have been surprised by the parklike, orderly look of this forest, free of tangling brush and strangling vines, but to Morg it was merely normal.

He carried an arrow nocked, as did the two companions who followed in his footsteps, and all of them scanned the branches overhead—eagerly, not fearfully, for there were no animals here that a man armed with a bow need seriously fear.

Morg was a splendidly-muscled savage, half a head taller than the others; while they were clad in hamster-skins crudely sewn together, he wore a garment fashioned of a single glistening-black pelt. He was a descendant of the first Morg, who had been a mighty man among those who, according to legend, had come from that Earth which some said was a country beyond the mountains and others, less credibly, claimed was up in the sky somewhere.

The trees lightened ahead, meaning that they were approaching cleared ground, and the trio relaxed their vigilance and quickened their pace, concluding that the reports of game in this forest tract—which lay only a mile from their tribe's village and had consequently been hunted-out—had been false.

Then branches crackled overhead; Morg ducked a flying twig and looked up to see a six-armed striped creature swinging forty feet above them, snarling down with a flash of fangs and chattering insults—insults which Morg understood, since he had a working knowledge of the viler portions of the thrin's rudimentary vocabulary.

So Morg cursed fluently back and took deliberate aim, drawing the arrow slowly back to its bronze head. The thrin broke off its tirade abruptly, performed a backward somersault and went brachiating away with ludicrous haste. The man grinned and let his bowstring slack without releasing the shaft; he didn't want to waste time looking for it or—if it should lodge in the thrin—have to climb a tree to recover it, since, as he knew from experience, even a dead thrin never let go of a branch.

Nor did the men bother looking round to see if the creature's tree-house was nearby; they were not hunting thrin.

Beyond the forest's edge lay a sunlit meadowland, and off to one side were the tawny patches of ripening grain-fields among which rose the beehive-shaped huts of the zgi, the agricultural species of Thegeth. The three hunters struck out quartering across the grassland toward the next forested area, giving the fields a wide berth. They knew that the grain which grew there was edible, but they also knew that it was taboo, as the zgi who tended it were also taboo, as it was forbidden to cut certain trees, and so on. The why of these things did not trouble them; they only knew that it had always been so. Of course there were numerous old stories about people who had broken taboo and had come to startling ends, but in real life the question of what would happen if you did so simply never came up.

In some vague way, the thagathla were behind the traditional law—the thagathla who, it was said, had placed man in the world and had bade him be fruitful and multiply. Deep at the roots of men's thinking lay the subtly reassuring conviction that they, together with the other living beings of forest and field, were part of a system, and that somewhere dwelt those who understood the whole, ruled and guided it with purposeful wisdom. If the thagathla had not existed, it would have been necessary to invent them.

Halfway across the meadow Morg spied a hamster sitting by its burrow's entrance, and nailed it with a well-aimed arrow. As he ran to retrieve it, a great

shadow swept suddenly over the grass with frightening speed, and the other hunters cried out. Morg looked up sharply, and saw before him a thing like an immense painted bird with immobile wings, settling silently to the ground.

Morg stood frozen. He heard behind him the frantic noise of his comrades' flight, and he still stood. A door opened in the aircraft's side, and a thegethli emerged and looked down at Morg.

Morg had never doubted that the thagathla existed—one saw their airships passing overhead, and from a mountaintop one could see the white towers of their city far away—but being face to face with one was a different matter. He dropped to one knee and laid his bow crosswise on the ground before him—but he kept a firm grip on the weapon, and though he bowed his head humbly his eyes were slitted and wary. If necessary, he could shoot very quickly from a kneeling position.

The thegethli was not so impressive-looking as he had imagined. He was struck most of all by its close similarity to the zgi—like a more graceful and refined version of the same animal, and with a larger skull. Morg would have had no doubts of his ability to worst this creature in hand-to-hand combat—but something, flash of intuition or echo of tradition, told him that the thagathla could not be met on terms of prowess.

The thegethli came down a flight of steps that seemed to grow out of the great bird's side. In the doorway above appeared another, whose arms cradled a gleaming metal tube.

The first one said in human speech, "Stand up, man. What is your name?"

"I am Morg," said the hunter. He stood upright, hands loose at his sides, deceptively relaxed, facing the avatar at only a few yards' distance. The thegethli involuntarily straightened for erect forebody so as to be taller than he.

"I have been looking for you, Morg," said the thegethli somewhat inexactly. "My name is Zilli."

"I have heard your name."

"Indeed?" said Zilli, not displeased. She recollected that five human generations—roughly equivalent to those of the males of her own kind—had passed since she had had any immediate contact with this community. Since then she had achieved the grade of ecologist and had, naturally enough, become the right-hand assistant of the coördinator specially charged with human affairs; it was gratifying to know that her reputation extended even among the lesser species.

"But perhaps you are not the same one," said Morg cautiously. "According to the old men, *the* Zilli is twenty feet tall, with eyes like fiery coals, and—"

"I am *the* Zilli," said Zilli stiffly. "And, speaking of fiery coals, it is about that that I want you to carry a message to your people. Some weeks ago a valuable tract of timberland to the west of here was completely burned over."

Morg bowed, without taking his eyes off the thegethli. "I understand. I will tell them that unless they are more careful with fire they will all be stricken with boils, rheumatism and lightning."

"Well—" Zilli hesitated, remembering the language in which her superior had recalled that one Zilli had authored—the original proposal for introducing a fire-using animal as a pest control. "Yes, you had better make it strong."

She eyed the man critically up and down, and said, "That is one matter. There is another: What is that garment you are wearing?"

Morg looked down at the sleek black pelt, tastefully secured at shoulder and hip with bronze fibulae. He said with a touch of pride, "It is a yuruk skin. I myself slew the beast."

"How is it that you are able to wear the hide?"

Morg blinked uneasily, scenting a trap. He said carefully, "If one wears a raw yuruk skin, true, it will make his own skin red and itching; and its meat will outrage a man's belly. For that reason, in my father's time we did not hunt the yuruk; but now it is known that if the hide and the flesh are soaked for a time in salt water—"

"I see," said Zilli. She had the simple explanation for what had been a puzzling development on the census records of the Bureau of Ecology: the fact that, in certain of the areas inhabited by humans, the slothlike herbivorous yuruk had fallen off inexplicably in numbers, and with them the thrin which preyed largely upon them and had—until recently at least—served as the principal check upon the yuruk's excessive multiplication.

Well, her report on this might produce a minor stir in the Bureau; but it was of small consequence balanced against the showing which, as the same recent censuses indicated, *Pseudothrin terrestris* Zilli was making in its intended role of counteragent for the rodent plague. She had not missed noticing the hamster which lay a little to one side, transfixed by Morg's arrow. Curious—in naming these creatures, Zilli had wrought better than she knew; now, in addition to their own ecological function, they were usurping that of the genuine thrin.

Zilli looked at the skin-clad hunter almost with affection; after all, he and his kind were her project. She said, "Very well. On the whole I am well pleased with your people, Morg. But do not forget to warn them about carelessness with fires."

Morg bowed again. The guard stood aside to let Zilli enter the flier; the door clicked shut behind them, and the craft rose steeply.

Morg stood watching it dwindle into the blue; when it was out of sight, he turned and strolled unhurriedly back to the edge of the woods. His two companions were crouched in the shelter of a thicket there; they met him with awed glances.

"What—" one of them faltered, "did the thegethli tell you, Morg?"

"Many things," said Morg mysteriously. "Many things." He was already turning over in his mind certain innovations which he had long thought about, but had feared to present to the elders as his own ideas. Now, his fellow-hunters were witnesses that he had truly talked with a thegethli; and he already savored in advance the looks the chief men of the tribe would wear when he, Morg, spoke to them as one conveying the will of the thagathla.

In particular, he wanted to broach the advantages of trading with the zgi, taboo or no taboo. Only a week earlier, he had found by experiment that those bovine and none-too-bright creatures were willing to pay well for cured yuruk hides; they received synthetic fabrics as well as tools from the thagathla in return for their crop surpluses, of course, but furs were to them a novelty which in the past they had had only when they happened upon a carcass freshly slain by thrin or other predators. In a pouch slung about Morg's neck burned the bit of iron he had received in exchange for just one hide; during the minutes past he had been on tenterhooks lest some second sight reveal it to Zilli. It

would make a phenomenal arrowhead, but he had found that he would need also an iron hammer to work it into shape. If yuruk skins became valuable trade goods, Morg, the mighty hunter, would become the owner of much iron.

He told his companions very seriously: "I am going to be a great man."

The farmer Morgus was rich. The fields worked by his numerous family and dependents stretched for miles around the big stone house that the present farmer's grandfather had built when he first settled in that country; and members of his clan, the Morgusi, owned most of the land in these parts, so that as patriarch of the clan he was a recognized leader through all the countryside.

Just now Morgus' face, in its frame of iron-gray beard, was set in hard and stubborn lines. He looked down from the elevation of his front porch at the zgi, and said gruffly, "No. How often do I have to tell you?"

The zgi—two stocky, powerful creatures, a head shorter than a man, like dwarfish and uncouth replicas of the thagathla to which their species was closely related—blinked dully up at him. One of them said, in its broken jargon that was a mixture of its own and human language: "Me . . . good job. Run plow . . . yes? Watch barn . . . yes?"

"No!" said Morgus. "For the last time—I've stopped using zgi. There are plenty of men who want to work, and they're better hands. On down the road with you. I hear that in the valley to the west they're still hiring your kind."

The zgi stared mournfully at him. Stupid as they were, they read the inflexibility of the farmer's manner; they turned and shuffled disconsolately away toward the highway.

Morgus watched their retreating figures suspiciously for a time, then turned to the door of his house. But then he became aware of a dust cloud approaching rapidly on the road from the east, and he halted with his hand on the latch.

The vehicle slowed to a stop at Morgus' gate, and swung cautiously, bouncing over tractor ruts, into the lane that led past the house to the barnyard. It was obviously one of the traveling machines of the thagathla, very different from the trucks which came to carry away the crop surpluses; this vehicle was long, sleek, and shiny beneath a fresh coating of dust. Its doors opened, and three of the ruling race climbed stiffly out.

Morgus squared his homespun-clad shoulders and advanced with a slow and dignified gait to meet the visitors. "Welcome," he rumbled. "To what do I owe—?"

"I am Ecological Coördinator Zilli," said the leading thegethli curtly. "You are the farmer Morgus? . . . Good. I wish to talk to you."

"Will the great one enter my poor abode?" With specious humility Morgus indicated the rambling stone farmhouse.

"Wait at the door," Zilli commanded her two bodyguards.

"But, Your Fertility—"

"There is no danger."

Morgus, leading the way, gave no sign of having understood the exchange in the Thagathlan language; in fact he had picked up a fair smattering of the tongue in his contacts with the assistant coördinators who made periodic tours of inspection. But a full-fledged coördinator was an unprecedented guest. And her name was Zilli—the same as one of the principal household gods of the Morgusi. Morgus was not superstitious; he believed in what he could see

and hear and in what his horny hands could grasp. But now, for quite unsuperstitious reasons, he was growing uneasy.

They entered the living-room—spacious, low-ceilinged, dominated by a great stone fireplace above which hung crossed hunting spears. In the doorway that led to the kitchen a woman, one of Morgus' daughters-in-law, stared round-eyed, clapped her apron over her mouth, and shrank from sight. From a sturdy table placed by the window where the light was best, a hollow-cheeked beardless youth looked up, rose to his feet like a startled animal, and eyed the thegethli uncertainly; on the table lay several thin slabs of wood covered with cryptic charcoal scrawls.

"My youngest son," said the farmer. Nervousness made him add with a loquacity unusual for him: "He is not strong enough for field work, so he keeps the records of the farm. He claims that with the system of marks he has invented it is possible to write our language as you thagathla write with your letters—and, to be sure, they seem to get mixed up less often than the old tallies used to."

Zilli was paying scant attention. "Morgus," she said sadly, "my assistants have brought me disturbing reports about you."

Morgus stroked his iron-gray beard. "How so? Haven't I and all my family amply fulfilled the produce quotas?"

"Yes. But—"

"We haven't even made any demands on the thagathla for new machinery or other factory-made goods, except for fuel, recently. If my son's bookkeeping isn't badly awry, we should have a respectable balance of credit in our favor." The boy looked embarrassed, but nodded vigorously.

"Yes, yes," Zilli admitted testily. "But that is beside the point. Be quiet and listen to me!"

She gazed somberly at the humans. Zilli was already well past the midpoint of her race's long life span; her crest was beginning to acquire a venerable patina, and she had risen to the coördinatorship once held by the now long-dead Mnigli, a position only three places removed in order of succession from the supreme pose of senior coördinator. At times like the present she felt the weight of her six hundred years, and of the changes that time had wrought since she had been an eager young junior biologist.

She demanded sternly, "Morgus, what were those animals I saw in a fenced field a little way down the road?"

"Animals?" Morgus hesitated briefly before he decided there was nothing to be gained by pretended ignorance. "Oh, ah, yes. Those were merely some pnid I've been fattening on the upland pastures. The creatures are very little extra trouble; they become quite docile when tamed, and the boys look after them while they graze."

"That cannot be permitted."

Morgus stared at the thegethli from under bushy gray brows. "Pnid are not taboo animals. The hunters kill them all the time."

"It is their domestication that we cannot allow. Formerly, when all the land here was cultivated by the zgi, there was no such problem," said Zilli a bit ruefully.

"We are not like the zgi—nor like the thagathla. We need meat!"

"You can hunt, then, or trade with the forest men."

Morgus glanced out the west window, toward where the wooded mountains rose dark in the distance. He scowled; he did not care for dealing with the men who inhabited the woodlands as his own ancestors had done up to a few generations back. They were, in his opinion, backward, uncouth, and thievish. And above all—From the window he saw also the fertile sweep of the new-sown fields, the neat fence-rows, and beyond, the rolling highlands with their lush high grass. He said hotly, "You have no right to order me about like that! It is *my* land and they are *my* pnid."

"It is not a question of property rights," said Zilli patiently, "but rather one of . . . of the ecological balance." Perforce she used a Thagathlan expression that conveyed nothing to Morgus save a hazy notion of "taboo."

"Very well," said Zilli. "I will try to explain this matter to you as to a reasonable being. Suppose that you—and your neighbors following your lead—were to go on pasturing the grass-eating pnid on the slopes yonder. Under your care, their herds would increase greatly, made safe from predators other than men, and provided with food and shelter in the winters. Sooner or later—in your sons' lifetime, perhaps, or your grandsons'—on the uplands denuded of grass by overgrazing, erosion would set in and increasing quantities of soil be washed away by every season of rains.

"Here in the valley where you farm, the excessive runoff would cause floods and would leach valuable elements out of the soil. Nor would the damage end there; drought would follow flood, because of the rain water which would have flowed away instead of being held back as at present, by the thick sod on the hillsides. A few dry summers would accelerate the process of erosion; and a vicious cycle would be established, which might end only in the drying-up and ruin of what are now first-class farmlands.

"Now do you understand why you must not herd the pnid?"

Morgus' lined face was stony. "You talk," he said, "about things that might happen a long time from now; or they might not. I am a practical man; I don't understand your complicated Thagathlan theories."

"Exactly," said Zilli. "If you did, you would be equal to the thagathla."

"I understand though that we need more flesh food than we can get by trading with the shiftless forest-folk or by hunting in time we can ill spare from farm work. There can be no harm in keeping a few beasts for our own use, and I intend to do so!"

Zilli drew herself up stiffly, eyeing the man with a coldness which covered a qualm of misgiving that she felt not for the first time in dealing with humans; this, though, was the first time she had met with open defiance. Zilli felt a sense of crisis, mingled with thankfulness that she still possessed a potent weapon, forged against just such an emergency by the provident foresight of the Psychological Division.

"Morgus," she said bleakly, "you forget yourself, and you forget what your race owes to us, the thagathla. You lay claim to reason, but your attitude belies the claim!"

She paused to let that sink in, but if it made any impression on the obdurate farmer she was unable to see it. She reflected briefly, not without a tinge of vanity, on the gulf that after all separated her own species from the human; the latter was undoubtedly of a high order of intelligence—witness its rapid climb

from its original stone-age culture to the use of metals and even some understanding of the agricultural machinery furnished by the thagathla—but it still looked on the world around it with the eyes of any other lower animal species, greedy to exploit its environment and multiply its own numbers without thought of consequences. The thagathla, on the other hand, were truly intelligent. They and they alone saw and understood and guided the whole, the all-embracing unity of field and forest, sea and desert, and the varied populations of plant and animal life which all together made up the single vast ecological community that covered Thegeth; that, biologically speaking, *was* Thegeth—the hierarchy of predators and prey, the network; of more subtle interdependences among countless species—the ecological pyramid. At the summit of the pyramid stood the thagathla, the controlling intelligence of the planet-wide system, because they understood—understood that they themselves as a species were an integral part of that system, no less and no more than the lowliest soil-boring worm or nitrogen-fixing bacterium.

And the human population of Thegeth was equally a part of the pyramid. True, since their introduction they had extended their ecological functions, with remarkable adaptability they had supplanted the now almost-vanished thrin as forest predators and were in process of pushing the zgi toward the brink of extinction by replacing them in their role of cultivators—displaying, unquestionably, more efficiency and ingenuity in that role than the zgi ever had. But those were developments within the system, affecting its essential integrity not at all. Whenever, as now, a situation threatened which *would* disrupt the total environment, the thagathla were at hand to intervene.

Reluctantly, Zilli brought her not-so-secret weapon to bear. "Where is your title to the land, Morgus?" she inquired.

The farmer's weathered face went sallow-pale. Now that it was too late, he saw the blow coming, saw that he should have foreseen it, but there was nothing he could do.

"*Where is the title?*"

Morgus' jaw muscles worked; veins swelled in his temples. His eyes peered huntedly from under their shaggy brows; they flicked furtively to the crossed spears over the fireplace, then swung slowly, unwillingly back to the motionless figure of the thegethli. Suddenly his shoulders sagged; he turned away, haltingly, like an old man. The silently watching boy stared at his father in fascinated horror.

The Psychological Division of the Bureau of Ecology had planned shrewdly. When man had begun emerging from the woods and cautiously but purposefully shouldering the zgi out of the arable tracts, the Bureau had correctly anticipated that this change of habitat would produce correspondingly deep-going changes in mentality; the mechanisms of taboo and superstitious awe which had served to keep the primitive hunter within the bounds of permissible behavior would not hold up under the impact of a new way of life and of closer contact with the thagathla. The psychologists observed the spontaneous beginnings of an emotionally-charged system of property relationships; they took those beginnings adroitly in hand, encouraged and shaped them to their own ends. The thagathla made the law, and under the law the right of ownership in land—symbolized by suitably impressive documents designed on the basis of

psychometric data—stemmed exclusively from them and held good solely at their pleasure.

The farmer Morgus felt the very foundations of his life crumbling.

"One moment, coördinator," he said thickly. "I . . . I will fetch the title—"

"That will not be necessary," said Zilli sharply; the scene was distasteful to her. "But you must get rid of the domesticated pnid."

Morgus looked briefly at her and dropped his eyes to the floor. "Yes, coördinator."

"And one more thing." Conscientiously, Zilli turned at the door. "The Aerial Survey has reported evidence that some members of your clan have been seeding lands supposed to be lying fallow. That must be stopped."

"Yes, coördinator," Morgus mumbled. He did not look up even when the grinding of wheels outside told him that the thagathla had departed.

At Morgus' side his son said breathlessly, "Do they take us for zgi?"

"What does it matter?" Morgus lifted his gray head heavily. "Ring the bell and call your brothers. We'll have to get ready to slaughter the animals."

The boy took a step to obey, then turned back hesitantly. "Father . . . I want to look at the title-deed the thegethli spoke of."

"What for?"

"Perhaps it doesn't really say all they claim it does."

"Suppose not—*they* have the power. And no man can tell what it says, anyway—it's *their* writing."

The boy bit his lip; but he persisted, "Perhaps after a time I can make something of it. I think they use the principle of a mark for a sound."

"As you like," said the father listlessly.

The boy rang the summoning-bell outside; and while they waited for the others to come from the field, he stood on the porch looking into the east. At his back, behind the house and behind the forested hills where the skin-clad hunters roamed, the sun was near setting. The eastern sky was shadowy; and against that darkening backdrop, luminous with reflected sunlight, the white-towered city of the thagathla glowed only twenty miles away across the plain.

Zilli left the automatic elevator and ambled slowly along the silent passage. Her old bones creaked, and she puffed with a shortness of breath that had troubled her during the last fifty years.

This corridor, at least, was the same as it had always been—virtually unchanged since the time, so long past, when an enthusiastic young junior biologist named Zilli had been summoned for the first time in her life up to the rarefied heights of the top-floor offices of that exalted being the senior coördinator, to be informed of her designation as a member of the Second and last Earth Expedition.

Now, on the door at the corridor's end, the faintly shining legend in flowing Thagathlan script read:

SENIOR COÖRDINATOR ZILLI.

Beneath it the same indication was repeated in the angular, graceless characters of the Human alphabet. This second inscription was brighter, because more recent.

The door of Zilli's office slid quietly open at her approach. In the roomy, well-lit chamber beyond, two men rose quickly to their feet from a paper-strewn desk by the great curved window that looked over the city.

One of them was Antan Morgu, Zilli's confidential secretary—a neatly barbered and manicured man of indeterminate age, dressed, as always, in conservative but expensive clothing of synthetic fabrics, and in a studiously affable expression. The other was a stranger, a large human who hugged a bulging pnidskin case as if fearful of being parted from it.

On the window ledge, Morgu's hamster sat up and watched the thegethli with a bright, beady stare.

Zilli stiffened her erect forebody, ignoring rheumatic twinges, and straightened her front pair of legs, making herself as tall as possible. It was a reflex she had never been able to suppress during all her association with humans, an involuntary reaction to the curious impression of *towering* which these two-legged creatures gave.

"Your Fertility!" the secretary greeted her in the Thagathlan language. "I wasn't expecting you in so early. This is my cousin, Rodon Morgu, who dropped by for a moment to discuss a private matter. If you don't mind, Rodon, you can wait in the next room till the current business is disposed of."

Cousin Rodon bowed awkwardly to the ancient thegethli, and speechlessly let himself be ushered, hugging his leather case, through the door which led to the adjoining chamber. Antan Morgu slid the door shut behind him, leaving it open just a little. Then he returned to the desk and began sorting papers.

Zilli waited silently. It was no news to her that her secretary led a double life. In his official capacity, he carried on most of the routine work of the

senior coördinator's office, and did so with an industry and efficiency which seldom left room for criticism, just as nowadays so many other humans were carrying on a multitude of important tasks formerly entrusted only to thagathla. At the same time, among his fellow-humans Morgu and other members of his family were highly regarded for reasons which Zilli had never thoroughly understood. Objectively, the thagathla had observed the existence and workings of an involved system of exchange and accumulation of value-tokens; these functioned, in interhuman relationships, as a sort of universal requisition-slip for goods and services, with the peculiar proviso that honoring them was not mandatory. But an intuitive grasp of the human enthusiasm for such activities was beyond an outsider.

Zilli knew, however, that among the aficionados of the token-exchange the House of Morgu was a name to conjure with.

Morgu finished assembling a pile of documents, and shoved the rest to one side. "These are the items currently requiring Your Fertility's signature."

The senior coördinator lowered herself stiffly to the kneeling-cushion beside the desk, and picked up the stylus which her secretary placed ready to her hand. For a time the only sounds in the office were Zilli's asthmatic breathing and the rustle of papers. Morgu stood gazing out the window which gave a lofty view over the gleaming towers and parklands of the metropolis. His tame hamster squeaked and hopped from the window ledge to its master's arm; he held it up and stroked its fur absently.

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Directive to Local Forest Administrators . . . Signature. *Schedule of Manufacturing Quotas for Region* 12 . . . Signature. *Requisition for Equipment of Urban Police Force* . . . Zilli hesitated briefly over this one; it seemed to her that such appropriations had been coming with remarkable frequency. But she dismissed the thought, and signed. Humans—perhaps because they were a male-dominated species—were prone to sporadic violence; it was fortunate that they were capable of channeling that tendency to violence so as to keep order among themselves. *Semiannual Program for Nitrate Recovery Plant No.* 4 . . . Something about that dry title jogged Zilli's memory, though she couldn't say just why. The document, like so many nowadays, was in the Human tongue, made officially equal to Thagathlan by a decree of some decades ago. Sighing, Zilli began laboriously perusing the angular-lettered text, replete with figures on sample densities of nitrogen-fixing swamp bacteria, on available water-circulating and evaporation facilities—

Zilli's thoughts persisted in straying to the man standing at the window. She wondered: *What does he see out there?*

Not that there was much doubt, of course, that human and Thagathlan eyes saw the same images in much the same way. But sometimes, in uneasy moments, Zilli wondered. Those biped creatures who swarmed in ever-increasing numbers in the streets where once only her kind had trod, who increasingly performed the functions in whose exercise the older civilized race had once been unique—did they see behind the superficial reality of this city, of this world, to the essence which *must* be obvious to any intelligent life form capable of performing those functions? In the beginning she had correctly judged the species adaptable; at the time no one could have guessed the full scope of its adaptability, the almost fantastic facility of imitation by which humans had transformed themselves successively, in a few brief centuries, into functional equivalents and supplanters of the thrin, of the zgi, and finally of the thagathla themselves. Mimicry was a trait alien to the thagathla; among humans, Zilli vaguely knew, it had subjective values ranging from flattery to mockery.

But, subjectively, "functional equivalence" means "essential identity"; that was a basic tenet of Thagathlan philosophy. What mattered now, as it always had, was not the survival of any particular species as such, but the preservation of the one world pattern, the balanced pyramid of the whole planet's life, potentially immortal as species and individuals are not. From that viewpoint, Man on Thegeth was a success. As originally foreseen, he had acted as an enduring check upon the hamsters which, six hundred years ago, had menaced the ecological balance; the further—and unforeseen—consequences of the importation of Man were immaterial, since they involved only displacements within the system, as irrelevant to the relationships making up that system as the substitution of different values for variables in an equation is to the form of the equation.

Thus it was in Thagathlan eyes. But the question still nagged at Zilli: *How do* they *see it?*

She forced her attention back to the document before her, and suddenly remembered what about it had disturbed her. She had a queer, sinking, panicky feeling. She said sharply, "Morgu!"

The man set the hamster back on the window ledge and turned, face bland as always. "Yes, Your Fertility?"

"This program for Nitrates 4," Zilli said slowly. "It is . . . a mistake. It calls for a two-fold increase in production, whereas the survey commission reported that any increase now would amount to destructive exploitation."

Still Antan Morgu's expression betrayed nothing. That impassive exterior, Morgu well knew, was one of his chief intangible assets.

But behind the mask he bitterly cursed his luck. *Now, of all times!*—just when he was at death-grips with Yano, when Yano was using every means, fair and foul, to drive him and the other Morgusi to the wall, when it was absolutely essential that Morgu's speculations in nitrate fertilizers be made to pay, furnish the capital to bolster up his other ventures and to strike back at Yano.

Zilli was eyeing him fixedly. "Morgu! Answer me—what is going on here?"

Fleeting, sardonically, Morgu wondered what the senior coördinator would do if she did know all that was going on—if she knew, for instance, that this very building, housing the central offices of the Ecological Bureau, was mortgaged to the hilt to shore up Morgu's schemes, or that certain interested, but carefully anonymous, parties had offered her confidential secretary up to a million and a half to resign from his strategic post. But it would be almost impossible to explain these things to Zilli. Intelligent as the thagaltha were, in some respects they were merely like lower animals, moving about the world in blissful oblivion of finance and politics.

His mind raced, seeking a way out. At another time he would have acknowledged the "mistake" and taken the loss—but the present crisis in his affairs ruled that course out. It wouldn't do to point out that there was an increased demand for fertilizers—Zilli would want to know why, and that could bring up the embarrassing question of what had happened to certain farmlands supposedly lying fallow according to the regular rotation plan. Nor could he argue that, even if exploitation of the nitrate swamps resulted in their exhaustion, one could fall back on known artificial processes for the fixation of nitrogen—in his position, Morgu was aware that a cardinal principle of the Ecological Bureau dictated that technology should supplement, not supplant, the functions of living organisms. He had never been able to grasp the concept behind that doctrine—according to the Thagathlan theoreticians, technological unemployment of even a swamp-slime would constitute betrayal of the organic community by its intelligent members, or something like that.

There was no possibility of selling the program to Zilli now—nothing to do but stall. Fortunately, the order for increased production had already gone out on Morgu's own authority, through human channels to human managers who had long since learned to regard the official dispositions as belated formalities; and if Morgu handled it right to gain time, his financial situation could be secured by the time a reckoning came.

Morgu allowed an air of worried concern to appear on his face. "Perhaps there has been a mistake, Your Fertility," he admitted. "Let us defer action until the question can be cleared up; I myself will re-examine it thoroughly." Unobtrusively he stretched out a hand for the offending document. But Zilli's delicately-clawed digits rested firmly on it, and she shook her crested head sternly, still regarding him with that peculiarly fixed stared. For Zilli things were falling into place: things noted and forgotten, discrepancies passed over, evidences of—

"No," said Zilli flatly. "I demand an explanation—*now*!"

This, then, was it. Morgu squared his shoulders and took a deep breath to utter words that would blow the lid off—and matters were taken out of his hands, abruptly and unpleasantly.

The door was wrenched open, squeaking protest. Three men flung themselves into the office; they were uniformed as Urban Police, and long knives gleamed in their hands.

Morgu started to lounge, then recoiled before the menacing blades. Two of the interlopers backed him against the wall; the third, ignoring the frozen Zilli, bent over the desk and began rummaging among the documents there.

"Zilli!" Morgu jerked out. "Button . . . underneath on the right—"

His voice choked off as a knife-point pressed hard against the pit of his stomach.

Zilli, numbed by the unheard-of situation, groped beneath the desk top; but she did not know where Morgu had installed the button that would summon the police in his pay from the floor below.

The intruder who had begun searching straightened and growled, "Back against the wall. You, too." He did not meet the thegethli's eyes, but his tone was as chill and threatening as the cold steel he held. Zilli stumbled shakily backward. She gasped, "What . . . is the meaning . . . of this?"

It was Morgu who answered her, in a taut voice: "These are Arak Yano's daggermen. Sent to forestall that Nitrates order. I knew he knew about it, but I didn't think he'd try anything so raw—"

"Shut up!" snarled one of the thugs.

Morgu's eyes were riveted to the man bending over the desk. As certainly as if he had heard Yano giving these hirelings their orders, he knew what those orders must have been—to assassinate Antan Morgu just as soon as they were sure of having found the vital paper, but not till then, in case they should have to force its location from him. With Morgu dead and the Nitrates deal shorn of official sanction, Yano would be unstoppable.

Luckily the searcher must have been scarcely literate; he studied the topmost document for crawling seconds, moving his lips, before he realized that it was the one they sought. As he picked it up and wheeled with an air of triumph, Morgu tensed himself.

The door on the opposite side of the office slid silently open, and framed the bulky figure of Cousin Rodon. He no longer had his pnidskin case; a grotesque mask covered his mouth and nose, and in his hand was an object which he tossed with lumbering precision. It hit the farther wall and burst with a *plop* in the faces of the pair who held Morgu at knife-point.

They reeled backward. One slashed wildly at Morgu as he dodged, then dropped the knife and folded at the knees. The third, paper in hand, took an uncertain step and a half before the gas hit him and he too, crumpled.

Morgu reached the desk in two strides, ripped open a drawer, hastily donned a second mask and, purpling, exhaled violently to clear it before drawing breath again. Then he pressed the signal button and turned shakily to survey the scene.

"Good work!" he said to Rodon, who was methodically gathering up the enemy's scattered weapons. "You'll be well rewarded for this. Are you all right, Your Fertility?"

Zilli had recognized the gas as the same which the Bureau's chemists had

invented for use against Terrestrial organisms at the time of the Second Earth Expedition; Morgu must have found the formula in the old files. Its effect on Thagathlan metabolism was not so marked—nevertheless, Zilli felt faint and might have fallen if she had not had four legs. She wheezed, "Yes. I am all right."

That was more nearly true fifteen minutes later, when Rodon and a squad of Morgu's trusted men had dragged out the would-be assassins—whether the police uniforms the latter wore belonged to them or had merely been a ruse to gain entry was still not known, but it didn't greatly matter—and the ventilators had cleared the coördinator's office of gas.

Zilli sat, looking somehow shrunken, and watched Morgu pace up and down. His tame hamster, still dazed from the gas, rode unsteadily on his shoulder.

"This time," he exulted, "Yano has overstepped himself. With the confessions we'll get from his agents, I can use the criminal law against him. The *human* law, you understand."

"Yes," said the thegethli tonelessly.

"Whether he can wriggle out of the charges or not, his hands will be tied long enough for me to close in on him financially." Morgu halted and looked closely at Zilli. He said in a different voice, choosing his words, "This incident has no doubt opened your eyes to . . . certain facts; facts which I should have been at a loss to have explained before."

"Yes," said Zilli.

"But I hope it will make no real difference. We can go on working together as before. That's been one of the issues between the groups I represent and Yano's criminal faction. Yano has boasted openly that, once he became financially and politically powerful enough, he would—dispense with the thagathla. But we are now in a position to wipe out that threat and guarantee continued interspecies coöperation. To be sure, there are some changes which ought to be made; in dealing with the present danger I've been uncomfortably hampered by some of the Bureau's obsolete regulations—"

Zilli said nothing. Morgu hesitated; he stooped and picked up the paper which lay crumpled on the floor, smoothed it out, then tore it.

"You can stop worrying about exploitation of the nitrate swamps. That's no longer necessary, now that we have a more potent weapon against the opposition.

"No longer necessary—until the next emergency arises?"

A pained shadow crossed Morgu's face, the look of one who sees his magnanimity go unappreciated. "Well, of course, no one can be sure what may happen."

"But with humans in control,"said Zilli, "something will always happen. You will go on from crisis to crisis, now that you have the power. Power that's important to you, isn't it? Where we thagathla erred—at the time, the many times when we might still have stopped you—was in supposing that all intelligent life must follow the same pattern."

She paused, short of breath; Morgu broke in, "But I've explained that nothing is changed. We can go on coöperating."

"Yes," said Zilli heavily. "We'll go on coöperating, until the thagathla are extinct. We were never alarmed because you might replace us; in the last analysis that would not matter. Our mistake was to think you would be satisfied with

merely *replacing* us. For us the final goal was always the balanced community, the ecological pyramid; but for you that is only a means to an end. To what end? That's what I'll never understand.

"But this I do know. Now that you've reached the summit of the pyramid, you'll not rest till you've torn it all down and built something more, or possibly less, to your liking, on the ruins. And your race will never make the same mistake. You will never quietly move over and allow yourselves to be supplanted, whether by some other intelligent species or by some new breed risen from among yourselves. When your time comes, as it must because no species is immortal, when finally you meet conditions changed even beyond your power to adapt—you will perish ungracefully, with as much noise and destruction as possible."

Antan Morgu stared puzzledly into the filmed old eyes of the thegethli. Thagathlan philosophy had always baffled him. He started to protest once more, then changed his mind, shrugged impatiently, and turned away; downstairs they would be ready to begin extracting some confessions, an affair he should supervise.

But in the open doorway he hesitated and faced round again. One utterance of Zilli's had stuck in his mind, he couldn't quite say why.

"What makes you say," he demanded, frowning, "that we've reached the top?"

THE END

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IN THE BEGINNING

By MORTON KLASS

In which *it is considered whether the smartest of all forms of life is necessarily the wisest of all.*

HOMO SAPIENS—*Means; "Man Who Understands." A vertebrate mammal, primate order, hominid family. After the disappearence of the preceding species, Neanderthalensis, Sapiens became the only extant species of man on Earth. Gradually increasing in numbers, Sapiens eventually populated the entire planet, with tremendous technological developments and intricate cultural variations marking—*

PROFESSOR PHILD PUTNAM was in no mood to argue about the existence of a soul. Anyone who had seen his face an hour earlier, as he surveyed the charred remains of his pet Brontosaurus, could have told the

delegates of the Anti-Resurrection League they were making a bad mistake in barging into the professor's office.

"Putnam!" Mrs. Featherby roared, coming straight to the point. She elbowed the Biology Department's prim secretary, Miss Kalish out of the way and advanced on the professor's desk like an irritated Mark IV tank. The horse-faced gentleman and the hatchet-faced lady pressed close behind her.

"Mrs. Featherby," Professor Putnam acknowledged wearily. He rose to his feet, less out of politeness than because it is easier to swing a desk lamp in a standing position.

The A-RL's guiding light in Connecticut slammed her pudgy hands down on his desk and stared up at him accusingly.

"I've just been reliably informed that you're going ahead with the monster. I . . . we've come here for an immediate denial!"

Professor Putnam glanced regretfully at the desk lamp. "To which, ah . . . *monster* . . . are you referring?" he asked cautiously.

"*You* know!" Miss Hassom piped shrilly from behind the protecting bulk of her chairlady. "That so-called prehistoric man. Ne-nean—"

"Neanderthal Man," Dr. Trine supplied, in his resonant baritone. "It is not enough, apparently, that you must question the decisions of Heaven, and return to the unwilling face of Earth those poor creatures which had been eternally banned from it. No, you needs must add insult to injury, profanity to desecration! Constructing an obscene, shambling, caricature of the most noble creation—"

"It won't have a soul!" Mrs. Featherby interjected. She resented having the floor taken away from her by subordinates. "It will be a soulless, inhuman Frankenstein monster—threatening the lives of women and children."

That was when the professor lost his precarious grip on his temper.

"What do you propose to do about it?" he demanded savagely, thrusting his reddening face dangerously close to Mrs. Featherby's. He pointed at the floor. "Down in the laboratory we have eight Neanderthal fetuses in tanks. You want to run down and smash the tanks? Somebody tossed a hand grenade in the Brontosaurus pen this morning. Why not blow up the whole college? Or you could wait till after they're completed and put ground glass in their food. It worked with our prize Eohippus last month—"

"How dare you!" Mrs. Featherby shrieked. "The idea! Accusing the Anti-Resurrection League of engaging in lawless, criminal activities!"

She whirled to face the cringing Miss Hassom. "I warned them!" she said angrily. "I *warned* the membership! I told them Professor Putnam wouldn't listen to reason! Why, he was the man who started all this filthy resurrection business in the first place! Is it likely he'd listen to reason? Take steps without consulting him, I said. But *no!* I was overruled!"

Miss Hassom hung her head.

"Surely, professor," Dr. Trine suggested smoothly, "you didn't mean what you said. The A-RL is composed solely of responsible citizens, honestly concerned about this terrible problem. But we in no way condone acts of violence. An apology from you, I am sure, would be sufficient to—"

"I'll apologize for nothing!" Professor Putnam slammed his fist down on his desk. "Your organization claims to be opposed to mob action, but everything you write in your newspapers or say over the radio is calculated to inflame

idiots into burning us at the stake! If you're not aware of what you're doing, you're bigger fools than even I think—"

"There's no point to our listening to any more of this drivel." Mrs. Featherby turned and marched to the door, and her cohorts fell in behind her. She paused with her hand on the knob for a parting broadside.

"If I were you, Professor Putnam, I would start emptying my desk drawers. I'll guarantee you won't be occupying this office by tomorrow morning!"

Dr. Trine, the last one out, closed the door gently behind him.

Putnam sank back into his chair and ran a shaking hand over his eyes. "If you were I, madam," he muttered somberly, "I'd throw myself to the Tyrsnnosauri."

"Can . . . can she do it, professor?" Miss Kalish asked timidly from the far corner of the office.

"Do what?" Professor Putnam stared at her sharply. "Oh . . . have me fired? I don't know. Probably. They say a third of the Board of Trustees are members of the A-RL."

He shrugged and stood up. "I'm not going to worry about that now. It's bound to happen, sooner or later. What's more important is that the Neanderthalenses should achieve completion today. I want to be there—"

He started for the door, then hesitated. "Would you care to come along, Miss Kalish? I don't have to tell you what this means to me. Besides, that won't be a pleasant phone to answer for the next few days."

Miss Kalish stared down at the floor, absently smoothing a crease in her severe skirt. "I—" She hesitated. "Please don't be angry, Professor Putnam, but . . . what Dr. Trine said—" She raised her head suddenly and took a deep breath. "Will . . . will they really be shambling, horrible looking creatures?"

Professor Philo Putnam ran a hand through his stiff gray hair. "Miss Kalish," he said, with gentle reproach, "I'm not angry, but I am surprised at you. You're not a biologist, of course, but you've been my secretary since I became head of the department. Surely in fifteen years you've learned *something* about what I'm doing—"

"That's not fair, professor!" Miss Kalish interrupted heatedly. "I guess I know as much about some things as half your graduate students! Didn't I type the final manuscript of your paper on artificial uteri? Why, I stayed up with you all night when you were waiting for your first embyro chick to hatch out of its tank. And I never said anything when you started resurrecting fossils—and you should have heard how my mother carried on! But this is different—"

"There's nothing different about it! If I can take an Appelbaum chromosome print from a bone cell of a Stegosaurus fossil and transfer it to a crocodile zygote, what's different about changing the gene pattern of a chimpanzee zygote to that of a Neanderthal? Both the method and the result are the same. In one case you end up with an infant Stegosaurus, in the other—"

Miss Kalish gestured impatiently. "That's not what I'm talking about at all professor! The thing is, I've seen some pretty awful things come slithering out of your tanks, and I've never turned a hair." She gulped and looked ill. "But if you start fooling around with . . . with *human* babies, or something like them,

and they come out looking like what Dr. Trine said, and grow up to be shambling beasts—well, I just don't want to go down to your old laboratory!"

Turning away from him, she burst into tears.

Philo Putnam clucked sympathetically. He walked over to her and put his arm around her shoulders. It was the first time in all their fifteen years together that they'd had any sort of intimate contact, and it disturbed them both considerably. Miss Kalish stiffened and stopped crying, and Professor Putnam dropped his arm awkwardly. Privately, the professor was astonished to realize that it was also the first time in fifteen years he was aware of his secretary as a female. He thought back. Well, make it thirteen.

"The . . . ah . . . nine-month-old fetus, Miss Kalish," he said, clearing his throat uncomfortably, "is never prepossessing, I'm afraid. But I'm sure you've seen preserved specimens from time to time without being unduly upset. The ones in the laboratory are alive, of course, which shouldn't bother you. There are practically no differences between them and other human infants. I'll guarantee that a month after completion they'll be sufficiently attractive to provoke the usual feminine gurgles."

He raised a hand to forestall a threatened interruption. "As for what they'll look like when they reach maturity," he went on, "that's one of the reasons we're doing this experiment. We know about Neanderthal's bone structure and whatever else we can infer from that. But we don't even know whether he was hirsute or hairless. If our specimens run true to form, they'll be about five feet tall, give or take a few inches, with receding brows and chins, long arms and slightly bent legs. That may not sound very handsome to you, but then, you're not a lady Neanderthal."

Professor Putnam smiled hopefully at his secretary. "Now, Miss Kalish—would you care to come down to the laboratory?"

"Why, certainly. Thank you—professor," Miss Kalish said demurely, and started for the door. Moving swiftly, Professor Putnam managed to get to it in time to hold it open for her.

There were only two men in the laboratory when they arrived, but the large room seemed surprisingly crowded. This was not caused, of course, by the presence of Oscar Felzen, Professor Putnam's senior lab assistant. Undergraduate rumor had it that Felzen actually slept in the laboratory at night, tucked on a slab alongside of the department's skeleton. Certainly, the thin, retiring, Felzen was as much a part of the laboratory as the cages of Pterodactyl chicks and the piercing odor of maldehyde.

But the heavy-set man in the blue pinstripe suit who paced restlessly in front of the bank of tanks, on the other hand, definitely did not belong in a laboratory. President D. Abernathy Grosvenor belonged where indeed he felt most at home—on a temporary grandstand at one end of the football field, introducing a nervous lieutenant-governor to row on row of cap-and-gowned students and doting parents.

"Ah! Professor Putnam—here you are at last!" President Grosvenor announced, as the biologist and his secretary entered. Hesitating uneasily for a moment, he went on: "Your assistant has been showing me around"—Felzen stared at him astonished—"and I must say it has been most informative. Fine laboratory. Good work. Wish I had more time to wander about and see all the

magnificent things you fellows are doing. Unfortunately, running a university is a full-time job. Have to forget about what *I'd* like to do, and concentrate instead on all those unpleasant, but absolutely necessary details of administration that only I—"

President Grosvenor took a deep breath. It was obvious he had arrived at the crux of his visit.

"Matter of fact, that reminds me of what I came to see you about, professor." He shook his head mournfully. "Really, professor, you should have been more diplomatic with Mrs. Featherby and her committee. I did my best to explain to them that you're a scientist—temperamental, deeply engrossed in your work—and all that, but I'm afraid they were too enraged. If only you'd bear in mind that since the horrors of the Atomic War, hatred of scientists . . . well, Mrs. Featherby said something about taking the matter up with one of the trustees, and stormed out. When nobody answered in your office, I came here. I must say you took your time getting here, incidentally—"

"I didn't come directly," Professor Putnam said, breaking in, his face growing almost as red as Miss Kalish's had become. "My secretary and I . . . uh . . . had some matters to discuss. But I am sorry I lost my temper with that insufferable committee. If I had known they were going to land on your neck—Just the same," he added heatedly, "what was I to do? Basically, they won't be satisfied until I forget about this experiment entirely. And then they'll be after us to stop doing other things. Eventually, I'll be reduced to breeding new strains of geraniums, or something equally innocuous. Are you willing to go along with that, President Grosvenor? Shall I tell Felzen to start dismantling the equipment?"

President Grosvenor raised his hand dramatically. "Please, professor! As long as I am president of this university, no group and no individual—no matter how powerful—shall interfere with scientific freedom! You have my word!"

He paused and scratched his chin absently. "On the other hand, it must be admitted that this little . . . ah . . . contretemps, comes at an awkward time. And the trustees, when awakened, can be exceedingly difficult to deal with. Would it not be the better part of valor to . . . say . . . postpone this experimant for a little while, professor? I'm sure there must be tremendous areas of prehistoric life which you haven't studied as yet. I'd say, forget about Neanderthal and restore some other creature. When you come right down to it, you know, Neanderthal *was* just an animal, and surely it's ridiculous to get so hot and bothered over it."

Professor Philo Putnam frowned. "Neanderthal Man," he said carefully, "was *not* an animal—not in the sense you're using the word, anyway. He was a human being, of a different species, perhaps, but nevertheless a human."

The president waved a deprecatory hand. "Please, professor!" he admonished. "For the purposes of this discussion, there's no point in being rigidly technical. The creature may have been approximately human, but so is a gorilla. Neanderthal was a subman, with only the most rudimentary capacity to think, to create, or to do anything else that we term human. Surely you'll concede that?"

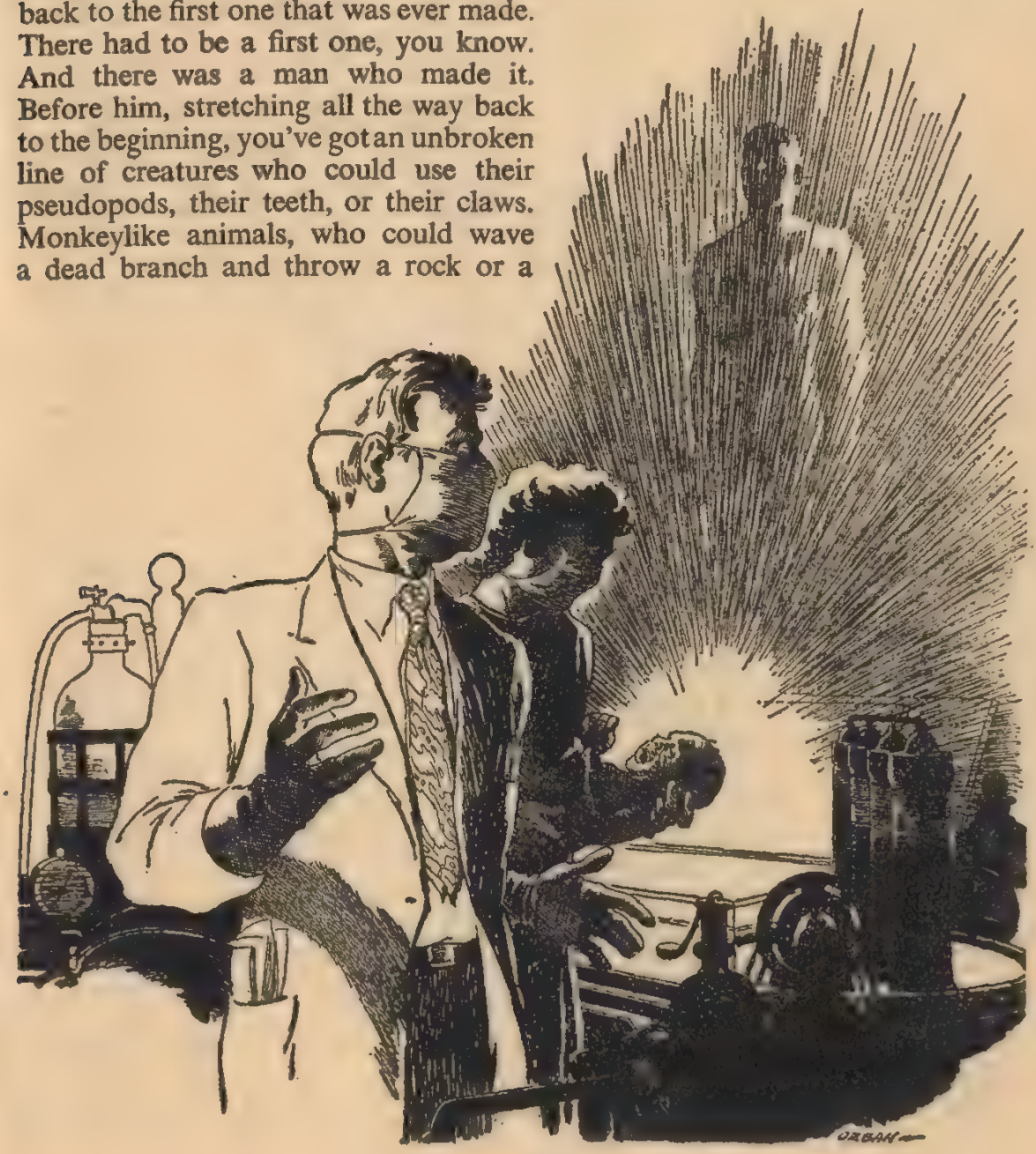
Philo Putnam strode over to his workbench and picked up a large rock. He turned, and President Grosvenor retreated a step in sudden alarm. Exhibiting the rock, the professor demanded, "Do you know what this is, President Grosvenor? You probably don't, so I'll tell you. It's an Acheulian flint hand-axe—

maybe three hundred thousand years old, or older. Neanderthal Man made it, and an anthropologist friend of mine presented it to me about a year ago. I haven't been able to get it out of my mind. Shall I tell you why?"

Oscar Felzen and Miss Kalish, both intrigued, nodded their heads, but the professor was staring at Grosvenor.

In a soft voice, he went on: "It's a crude, unprepossessing weapon. Compared to a nuclear fission bomb, the thing is pathetic, and it certainly wouldn't stand a chance against a rifle. As a matter of fact, it couldn't even compete with the arrows of our Cro-Magnon ancestors. But if you look at it from another angle, what a tremendous thing it is!"

He held it up in both hands turning it slowly. "I'm not talking about the chipping technique, though I understand it represents magnificent craftsmanship. Forget about this specimen, and think back to the first one that was ever made. There had to be a first one, you know. And there was a man who made it. Before him, stretching all the way back to the beginning, you've got an unbroken line of creatures who could use their pseudopods, their teeth, or their claws. Monkeylike animals, who could wave a dead branch and throw a rock or a



coconut. Later apes might even have carried a favorite rock or branch around with them. But this . . . this *man* . . . selected a lump of flint and worked on it until he had something which fitted his hand comfortably if he held it at one end. He fashioned the other end into a rough point, useful for cracking a bison's skull."

He waved the hand-axe at his listeners. "Note that word, 'useful. 'What he made was a tool, the first one ever seen on this planet! After him, you get makers of bigger and better, more varied and more complex tools, but he made the first one! Every inventor after him merely added to the list, but worked with tools which had already been invented. More important, they worked with the knowledge that tools existed. But the man who first conceived of a tool as such, who created the first one—what a mind he must have had! I wonder how many brilliant men who came after him would have had that much genius? Da Vinci, maybe . . . possibly Einstein? Certainly not the man who merely constructed the first wheel! And you call such a man subhuman?"

With a sudden surge of emotion, Professor Putnam snorted and shrugged his shoulders.

President Grosvenor cleared his throat uncertainly. "Very interesting theory, professor, though a bit fanciful, I suspect. This entire discussion has nothing to do with the matter at hand, but since we've been carried along this far, I'd like to point out an obvious weakness in your argument. I'm a student of history and political science—not the laboratory sciences—and what stands out to me is not Neanderthal's mechanical abilities, however great they may or may not have been. You pointed out yourself that he went down under Cro-Magnon's arrows. Pragmatically, then, he was inferior. He could not stand the acid test of survival. He was supplanted by a superior human—"

"Superior! Certainly! But superior *how?*" Putnam spat the words out angrily. "Superior as a savage—as a killer—as a beast! You talked about my being fanciful . . . now I will get fanciful! Think about Neanderthal; the first rational, creative creature on Earth—which he was—with his tools, his art, his religion and culture. Suppose he was a peaceful basically civilized creature, painfully working out the first formless beginnings of civilization. Then along comes our ancestors—noble savages, perfect savages! They acquire his knowledge, improve upon it in a typically savage way—to construct better instruments of destruction—and so destroy the actually superior Neanderthal, as they did every other creature who ever got in their way!"

"But nevertheless—Cro-Magnon did win out. You've got to admit that's *some* indication of superiority!"

Professor Putnam shrugged again. "If I did, I'd have to admit the inherent superiority of every shark that ever chewed up a swimming man. It's the superiority of the beast in its natural habitat. If my thesis is correct, Cro-Magnon was a better savage. Certainly his record as a civilized creature isn't very much to boast about—"

"But this is all idiotic!" President Grosvenor shouted. "We're wasting time arguing about a lot of thoroughgoing nonsense. What matters is, will you or will you not discontinue your present experiment? That's what the Board of Trustees will ask me in a little while, and I've come here for your assurance that you will!"

Philo Putnam took a deep breath. Before answering, he glanced at the worried faces of Oscar Felzen and Miss Kalish. He smiled at them, briefly, and walked absently over to the bank of tanks.

Staring down through the transparent top of the nearest tank, he said, "I'm very sorry, President Grosvenor, but it's out of the question, I don't want to be unreasonable, or cause you embarrassment, but when I work at something I do it because that's the next thing for me to do. I can't quit and do something else simply because at this moment there's nothing else *for* me to do. Everything else has either been done already, or has to wait until I assimilate the results of this experiment. I might just as well quit."

"Don't you realize, Putnam, that you'll have to do exactly that if you don't back down? I'd protect you if I could, but I can't! The A-RL is too powerful, and they're out to get you this time. If only you'd— What's wrong, man?"

Professor Putnam was staring down into the tank with mounting excitement. After consulting the instrument panel on the wall above, he whirled and stared about the laboratory wildly for a moment.

"Miss Kalish!" he shouted, his voice cracking like a whip. "Open that cabinet on the wall over there. You'll find layettes and baskets for eight babies —set them up in a row on that bench. Make sure we have everything we need and that it's all sterile. *Move*, woman!"

With a muffled gasp, his secretary bounded across the floor. The professor switched his attention to Felzen. "Better get the incubators going, Oscar—we may need them. And do something about the temperature of the lab—it's freezing!"

Putnam trotted in the direction of the tank on the far end of the bank. The open-mouthed president caught at his arm as the biologist went by.

"Look here, Professor!" President Grosvenor protested. "I don't know what's going on, but we have an important matter to settle. The Board of Trustees—"

"Blast the Board of Trustees!" Philo Putnam exploded. "And let go of my arm! Don't you understand? Can't you see the red lights are on over the tanks? Completion is about to take place!"

"That's all very well," President Grosvenor said firmly, "but the fact remains that your position in this university is in jeopardy. I refuse to leave until you give me a direct statement."

The professor's face reddened. Then he took a deep breath and held it for a long moment. When he spoke, his voice was surprisingly calm.

"Tell the trustees—and the Anti-Resurrection League—that as long as I am in charge of my laboratory I alone will decide what experiments I am going to conduct. If you and the others decide to knuckle under to the A-RL, that's your business, not mine. Do anything you like—put Mrs. Featherby in charge of the Biology Department—but right now, get out of my laboratory and stay out of it as long as it's mine! I've got work to do!"

His voice rose dangerously on the last words, and the president released him and stepped back.

"You're being very foolish, Putnam—very foolish. I'll do what I can, but—" He paused at the door. "If I were you—"

"I know! I *know*! I've already emptied my desk drawers! Now get out!"

Before the sound of the door slamming had died away, Professor Putnam

was bending over the last uterine tank in the bank, crooning softly and happily to himself.

It was Miss Kalish who timidly proposed coffee about two hours later. Two hours of continually checking over preparations, peering at dials and gauges, and making careful notes of fetal movements, had thoroughly exhausted all three. Professor Putnam nodded glumly, an with a relieved sigh, Oscar Felzen had started a pot of coffee going on the lab hotplate.

"How much longer will it be, Professor Putnam?" Miss Kalish asked, puncturing a can of condensed milk.

The professor shrugged. "Hard to say. Human births take anywhere from one to eighteen hours. The tanks are set to respond to the needs of the individual fetus, so for all I know we may be here all night." He smiled benevolently at his secretary. "No need for you to stay, Miss Kalish. Go home, if you like."

Miss Kalish shook her head emphatically. "Certainly not! I mean—if it's all right with you, I'd like to stay. Since my mother died, I can stay out as long as I like."

Her eyes brightened, and she chuckled softly. "This is so much like old-times. Remember how we all sat around drinking coffee and waiting for that chick to hatch? It never did, did it, Professor Putnam?"

The professor cleared his throat. "No, I'm afraid it never did. The next one did, though. Ah . . . call me Philo, ah . . . Leona. I doubt if I'll be a professor much longer in any case."

"You might have been, if only you'd kept your head with the president," Oscar Felzen grumbled, as he poured coffee all round. "Anyway, you didn't mean all those things you said to him, did you? About Neanderthal having been a superior race, and modern man his inferior. That's hardly scientific—"

"I know, Oscar—you're right. I went too far. About Neanderthalis, anyhow. I'll admit *that* part may have been vague theorizing, but I'll stand behind anything I said about the species which supplanted him."

"What's wrong with us?" Miss Kalish demanded.

Professor Putnam shrugged and sipped his coffee. He made a face and added another spoonful of sugar. "With us? As individuals, maybe nothing—maybe a lot—I don't know. But as a species we've got plenty to be ashamed of. Oh, we build things and erect cities, but everybody knows that's only supposed to be the beginning. Once we actually get a civilization started, what always happens? What happened to Babylon, Greece, Samarkand, Chichen-Itza, and all the others? Either they're torn up by their own internal stresses and strains, or howling conquistadores come along and smash everything."

He took a long swig of coffee. His secretary seized the opportunity deftly. "But you can't blame that on the individual! People don't want to fight or break things or kill. If a whole society goes crazy, how can you blame the poor man or woman—"

"Who else can you blame? Who makes up the society? What's a mob?"

"There have been some people who didn't go along with the others," Felzen pointed out.

Professor Putnam nodded violently. "Certainly! And what happens to them? Any time a Socrates or a Michael Servetus opens his mouth, the crowd —the mass of individuals present—rips him to pieces. Face the facts! The

[*Continued on page* 116

QUESTION AND ANSWER

By POUL ANDERSON

Second of Two Parts. *That the people they met on Troas were aliens was beyond doubt. But . . . how alien? How dangerous? Where was that First Expedition . . . ?*

Illustrated by Freas

SYNOPSIS

Two centuries of war had ended with the unification of the Solar System under a parliamentary government which leaned heavily on the "psychocrats"—men trained in the new techniques of mathematical mass and individual psychology, who used their science in an attempt to bring together a human race still divided into quarreling factions and to improve their war-impoverished economy. About this time the warp drive was invented and made the stars accessible, and an overcrowded humanity waited eagerly for new worlds to colonize. But years of searching failed to turn up any planet which could be used; most were deadly to man, some few that he could inhabit already had natives, and the logistics of interstellar warfare made conquest of reasonably advanced aborigines an economic impossibility. Some hope was revived when an astrophysical expedition to the Hercules cluster chanced on the double planet Troas–Ilium ("Junior" and "Sister") of the star Lagrange: observations from space indicated that "Junior" was uninhabited and might be colonizable. But the first expedition sent there disappeared. Years of disappointment produced a lack of public interest in the whole idea, and it grew increasingly harder to find men and money for further exploration.

The Lagrange Institute, a private organization, worked a long time to arrange a second expedition to Troas. Trouble dogged them, including an attempt to sabotage their half-built ship which was frustrated by the Turkish engineer, Kemal Gummus-lugil: and the crew which the government recruiting service finally obtained for Captain Hamilton was ill-assorted and inefficient. Among its members were the astronomer John Lorenzen, the geologist Miguel Fernandez, the puritanical Martian physicist Joab Thornton, and the soldier Friedrich von Osten. The Henry Hudson *finally got under way: en route, there were quarrels in the crew which the government psychologist, Edward Avery, seemed unable to prevent. Arriving at Troas, the* Hudson *found no trace of the first expedition or its ship, the* Da Gama, *but the planet did seem to be colonizable. Closer study when they landed confirmed this.*

Then a party of nonhuman beings came to the camp. They went on foot, but

seemed to be at about an eighteenth-century level of technology: though friendly enough, their race could prevent colonization if it chose, as it probably would. Avery tried to learn the language of these "Rorvan," reporting it extraordinarily difficult, but he did gather that they lived underground, hunting and gathering wild food rather than farming—which was the reason their works had not been seen from space.

After a while the Rorvan wished to return home; they refused a lift in an aircraft, and the humans who were to accompany them to study their culture and try to negotiate permission for a settlement, had to go on foot. This party was made up of Lorenzen, Avery, Gummus-lugil, Fernandez, Thornton, and von Osten. For weeks they trekked across the continent. Lorenzen tried to learn the language too, but the data given by Avery—who studied long hours with the Rorvan chief, Djugaz—was confusing. Avery explained that he was making some progress and didn't want to interrupt it to teach anyone else.

Part 2

X.

MIGUEL FERNANDEZ was born in that province of Latin America known as Uruguay. His family was old and wealthy, he had been one of the few who always got enough to eat. And there had been books, music, theaters, boats, horses; he had played polo for his continent in the world matches and sailed a yawl across the Atlantic. He had done good stratigraphical work on Luna and Venus, had laughed with many friends, loved many women, and gone out to the stars with a song.

He died on Troas.

It came with cruel swiftness. After two weeks of open prairie, they reached ground which rolled slowly upward, toward the dim blue forms of mountains peering over the horizon. It was a land of long coarse grasses, thick clumps of trees, coldly rushing rivers; always the wind blew, and there were many wings in the sky. Progress slowed down a bit as the Rorvan circled to find the easiest slopes, but you could still count on thirty kilometers a day or so. Avery said he'd asked how much longer the journey would take, but had not understood the answer, which seemed to be highly qualified.

The party was strung out in a long line, scrambling over tumbled boulders.

There was much life around here, tetrapteri broke cover with a flurry of all four wings, smaller animals bounded off with alarm, a distant herd of horned reptiles stopped and looked at the travelers with unblinking eyes. Lorenzen was walking near the front of the line, beside Alasvu, trying to improve his Rorvanian vocabulary by pointing to new objects. He saw a small, bright-colored beast lying on a rock, sunning itself—rather like an oversized lizard—and indicated it.

"*Volanzu,*" said the Rorvan. With practice, Lorenzen was getting so he

could distinguish individual phonemes; formerly, all of them had sounded much alike to him.

"No—" It seemed odd to the astronomer that Avery still didn't know the words for "yes" and "no;" maybe the language didn't include them. But—"No," he said in English, "I know that word, it means 'stone.' I mean the lizard there." He stepped up close to the animal and pointed. It arched its back and hissed at him. The double sun made a jewel-play of its iridescent scales.

Alasvu hesitated. "*Shinarran,*" he said at last, after peering closer. Lorenzen jotted it down in his notebook as he walked further.

A minute later, he heard Fernandez scream.

He whirled around. The geologist was already falling, and he saw the lizard clinging to the trouser leg. "*What the devil—*" He ran back, slipped on a rock, and got up in time to see Thornton grab the lizard by its neck and throw it to the ground and crush its head underfoot.

Then they were all crowding around Fernandez, who looked up at them out of tortured eyes. "*Hace frio—*" Thornton had slit his pants leg and they could see the fang marks and the purpling color around them.

"Poison—get that first-aid kit!" The Martian almost snarled it.

"Here—" Gently, Avery pushed him aside and knelt by Fernandez. As a psychman, he necessarily knew a good deal about medicine. His knife flashed, laying open the flesh.

Fernandez gasped. "I cannot breathe . . . *Madre de Dios*, I cannot breathe."

Avery bent to put his mouth to the wound, but straightened. "No use sucking it out if it's already got to his chest." His voice was dull.

The Rorvan crowded helplessly about, looking as if they wanted to do something but not knowing what. Fernandez's eyes rolled up and they saw the breast lie suddenly quiet.

"It's paralyzed his breathing . . . artificial respiration." Gummus-lugil's big hands reached out to roll the small man over.

"No." Avery was holding his pulse. "No use. His heart's stopped, too."

Lorenzen stood very still. He had never seen a man die before. There was no dignity to it. Fernandez lay grotesquely sprawled, his face mottled bluish, a little drool still coming from his mouth. The wind slipped between the crowding men and ruffled his hair. Death was an unclean sight.

Gummus-lugil fumbled for the radio on his back. "I'll call the camp. They've got means of reviving—"

"Not with this stuff in him," said Avery. "Smells like prussic acid. The speed of it—! It must be all through his bloodstream by now."

They stood quiet then, for a long time—each with his own thoughts.

Gummus-lugil called Hamilton and reported. The captain groaned. "The poor little devil! No, it's no use, we couldn't bring him back if he's been poisoned that thoroughly." It came out of the radio as a chatter of clicks. The Rorvan watched, and there was no reading their faces. Did they think it was some kind of ritual—that the humans thought a god was speaking to them?

"Ask him what to do," said Avery. "Tell him the Rorvan will still be going on and I, for one, am willing to follow them."

Decision came out of the machine: "Bury him where he is and put up a marker. I don't think his religion would frown on that, under the circumstances. Is anyone ready to give up and come back here? The car can pick them up.

No? Good. Carry on, then—and for the love of man, be more careful next time!"

It took a while to dig the grave with the few tools they had. The Rorvan helped, and afterward brought rocks to make the cairn. Avery looked at Thornton. "Would you like to say a few words?" he asked, very softly.

"If you wish," said the Martian. "But he wasn't of my faith, you know, and we haven't anyone of his along. I will only say that he was a good man."

Was it hypocrisy? wondered Lorenzen. Thornton, to whom Fernandez had been an unbeliever; Gummus-lugil, who had cursed him for his noisiness; von Osten, who had called him a weakling and a fool; Avery, to whom Fernandez had only been one more factor to stabilize; he himself, who had never been particularly close to the man; even the Rorvan—here they stood around the grave, unspeaking save to voice a sense of loss. Was it only a meaningless form, or was it some recognition of the awesome stillness and the common destiny of all life? There was nothing more they could do for the dead flesh down under those rocks; did they wish they had done more while it lived?

By the time they were through, it was too late to travel farther. They gathered dead branches, cut the sere grasses and bushes for a campfire, ate their evening meal and sat very quietly.

Djugaz and Avery went on with their language studies; von Osten rolled over and went grumpily to sleep; Thornton read his Bible by the dim red flicker of light; the other Rorvan murmured to each other, no more than a whisper. The fire crackled loudly; outside its wavering circle of light, you could see the moonlit world, and hear the wind talking in the trees. Now and then an animal howled, far off in the darkness, a long and lonely sound. It was not the night of Earth, not any night such as man had known—not with that double crescent huge in a cold starry heaven, not with those noises out there. A long way home, a long way for the soul of Miguel Fernandez to wander before it found the green dales of Earth.

Lorenzen murmured to himself, almost unconsciously, the ancient words of a Lyke Wake Dirge, and looked to the vague, red-lit mound of the grave.

[*Please turn page*

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Light and shadow wove across it, almost it seemed to stir, as if the one within had loved life too much to lie quiet now.

"This ae nighte, this ae nighte,
Every nighte and alle,
Fire, and sleet, and candle-lighte,
And Christe receive thye saule."

(And in the north lay eternal winter, the moon like icy rain on its glintering snows, the stars high and chill above the blinking glaciers, between the weird pale flimmers of aurora.)

"When thou from hence away art paste,
Every night and alle,
To Whinny-Muir thou comest at laste;
And Christe receive thye saule.
"If ever thou gavest hosen and shoon
Every night and alle,
Sit thee down and put them on;
And Christe receive thy saule.
"If hosen and shoon thou ne'er gavest nane,
Every night and alle,
The whinnes shall prick thee to the bare bane;
And Christe receive thy saule."

(What have we ever given each other, of kindness and help and love, in all the long nights of man? What can we ever give each other?)

Gummus-lugil moved over and sat heavily down beside him. "One down," he murmured. The weaving light etched the strong thrust of his face against darkness. "How many more?"

"It was the little things Hamilton was afraid of," said Lorenzen. "Not earthquakes and monsters and big-brained octopi, but the snakes and germs and poison plants. And he was right."

"A thing with cyanide in its fangs—what kind of metabolism is that? Can't have blood like we do." The engineer shivered. "It's cold tonight."

"It can be licked," said Lorenzen. "If that's all we have to fear, it isn't much."

"Oh, sure, sure. I've seen worse than this. It was just so—sudden. Why, you almost touched that thing yourself. I saw you."

"Yes—" Lorenzen felt sweat at the thought.

It struck him then, Alasvu had not warned him.

He held himself quiet, admitting the realization piece by piece, into his mind, not daring to let it burst in all at once. Alasvu the Rorvan had not pulled him back from the lizard.

He looked across the fire to the small group of the aliens. They were in shadow, only their eyes glowing out of darkness. What were they thinking? What had they planned for these strangers from beyond the stars?

He wanted to tell Avery . . . no, let it ride for now. It could have been an accident. Maybe the lizards were rare, maybe this group of Rorvan had never seen one before either. Alasvu himself had been within centimeters of the fangs. The aliens couldn't be so stupid as to think they could murder every one of the humans and make it look like an accident!

But the *Da Gama* had never come home—

He forced down a shudder. He was tired, overwrought, his suspicions were

childish and he knew Avery would label them as such. And if he told von Osten, the German would probably want to shoot all the Rorvan on the spot. Gummus-lugil and Thornton—well, not just yet, let him think and gather evidence before making a fool of himself.

He looked out into the western darkness. That was the way they were heading, into the mountains, into canyons and gorges and up the thin slippery trails where anything could happen. And they couldn't turn back, not now, though they had no dimmest idea of what might be waiting for them.

"From Whinny-Muir when thou mayst passe,
Every nighte and alle,
To Brigg o' Dread thou comest at laste,
And Christe receive thy saule."

XI.

The land climbed rapidly, until they were scrambling through a wilderness of harsh rocky hills, between gaunt patches of shrub, and across brawling rivers whose cold was like teeth in their feet. It was hard to follow the Rorvan, their light, graceful forms wove and bounded over the tumbled country; Lorenzen's breath was often dry in his throat as he gasped after them.

One evening, about a week after Fernandez's death, Hamilton's question clicked over the radio: "What is wrong with your guides, anyway? You're arcing north again. Why haven't they led you straight to their home?"

Gummus-lugil looked surprised, but shouted the question to Avery. "Ask one of those hairy brutes why, will you? I'm sick of walking, myself."

"I have," said the psychman. "Didn't I tell you? But the answer seems to be another of those untranslatable things. I got an impression of dangerous territory which we have to skirt."

Gummus-lugil passed the reply on to Hamilton, who closed his sending with a click that might also have been a grunt. The Turk sighed. "Not much we can do about it," he said.

Thornton chuckled. "Perhaps they mean to run us bowlegged and thus have us helpless," he suggested.

Von Osten clapped a hand to his rifle. "Dey lead us straight or—"

[*Please turn page*

THE ANALYTICAL LABORATORY

Here's *your* decision on the September 1954 issue:

Place	*Story*	*Author*	*Points*
1.	Rite of Passage	Chad Oliver	2.00
2.	Fighting Philosopher	E. B. Cole	2.23
3.	The Thousandth Year	Robert Abernathy	2.53
4.	Age of Retirement	Hal Lynch	3.68
5.	Marshmallow World	Joseph Whitehill	4.16

THE EDITOR.

"No, take it easy, will you?" Avery spread his hands. "There isn't much we can do about it, I'm afraid. They *are* the guides."

Lorenzen scowled. It didn't ring true. More and more, the whole business was looking questionable.

He pulled out an aerial map of the territory and studied it for a long while. As far as he could see there was nothing to distinguish the area which they were avoiding. Of course, there might be hostile tribes or something, but—

For every question he could raise, there was an answer. But all the answers were too *ad hoc*, they didn't fit into a consistent picture. All right, the poison lizard had been a species unfamiliar to the Rorvan, that much was pretty obvious; but why was it new to them? Any animal that formidable ought to have a pretty wide distribution—nor had the Rorvan come so terribly far from what seemed to be their own stamping grounds. Yes, the native language might be extremely difficult, but blast it!—a society, to be capable of the technology the Rorvans seemed to have, *had* to think and speak in terms which fitted the necessary concepts. When Western science was introduced to the Orient, the Chinese had generally talked and written about it in English or French, their own tongue wasn't suitable. So the Rorvan speech ought to have some structural similarity to the Indo-European group, enough so that Avery shouldn't be having all the trouble he claimed to be having.

For that matter, he was holding long conversations with Djugaz every night. He *said* they were language lessons, but—

Suppose they weren't?

Lorenzen sat quietly, letting the thought seep into his consciousness. He wanted to reject it. He liked Avery; and there was so little they could trust on this new world that if they couldn't even rely on each other—He must be getting paranoid.

Then there was still the *Da Gama*, a giant question mark floating somewhere out in space.

He lay in his sleeping bag, feeling the hardness of the ground beneath it, listening to the wind and the rushing river and the hooting of some unknown animal. His body was tired, but there were too many questions boiling up in his head for him to sleep. What had happened to the first expedition? Who had tried to sabotage the second? Why had it had such a heartbreaking series of minor difficulties before getting started? Why had Avery failed to mold its personnel into a unified team? Ill-assorted as they were (why?) it should still have been easy for a skilled psychman. Why were the Rorvan the only Mammalian species encountered so far? Why didn't any of their artifacts show from the air? Why did they have such an incomprehensible language? Or did they? If not, why was Avery lying? Why had the Rorvan failed to recognize a danger which should be as well-known as a cobra on Earth? Their metabolism was enough like man's so it should be a menace to them, too. Why were they doubling the length of the journey to their home? Why, why, why?

For every question there was an answer, either given direct by Avery or advanceable as a plausible hypothesis. But taken *in toto*, the answers violated Occam's principle; each explanation required a new entity, a new set of postulated circumstances. Wasn't there any unifying fact which would account for it all? Or was the whole thing really a jumbled mess of coincidences?

Silish was on guard, prowling around and around the dying fire. He was a noiseless, flitting shadow, only the faint gleam of light on his eyes and his musket to give him away. Now and then he would look over the sleepers—and what was he thinking? What was he planning? He might hunt and sing and play chess with the humans, but they were more alien to him than the bacteria in his bloodstream. Did he really feel any sense of kinship, or was he party to some monstrous scheme which had already swallowed one ship and killed a man of the second?

Avery might not be lying at that. He was a trustful, friendly little cuss. A psychman should know better, but then, he wasn't dealing with humans. Maybe the Rorvan had blinkered his eyes for some purpose of their own. Or had he been bribed somehow? But what could they buy him with?

Lorenzen turned, hungering for sleep. It wouldn't come. He had too much to think about, to much to be afraid of.

Resolution came at last. He couldn't tell anyone else what he suspected, not yet. There wasn't enough privacy in the group. No telling—maybe the Rorvan had picked up some English. Anyway, he had no proof, nothing but a hunch. *Take it easy, take it very slow and easy.*

But he had the beginnings of a Rorvan vocabulary. Suppose, without telling anyone, he tried to learn more. Mathematical analyses of data were out—he'd be seen performing those, except for what he could do in his head. But if you assumed that the language was basically inflected, its structure not too unlike the Aryan—by listening in on conversations, he could recognize words he knew and get some of the conjugations and declensions; new words would come from context. It wouldn't be easy, it would take time, but maybe he could do it. A lot of words could be learned by just asking, if they didn't suspect he was on the trail.

Eventually he was able to doze off.

XII.

"It iss murder, I say!"

The wind whined about von Osten's words, blowing them raggedly from his beard. He stamped cold feet, and the ringing rock gave the noise back.

Around him and Thornton, mountains climbed steeply toward an ice-blue sky, their peaks sharp and white against it, their lower slopes tumbling in a dark cruelty of rock down into a gorge and a remote hurrying river. The land had climbed terrifically in the last few days, a great block of stone thrust up between the plains and the sea. Waking in the mornings, the travelers would find a thin layer of snow on the barren ground, and their breath smoked white from their nostrils. Hunting was poor, and some days there was little enough to eat; progress was a slow scramble over cliffs and crags, down and up knife-like ravines. It had been agreed to make camp for a couple of days and devote the time to foraging—getting enough food for the last push over the pass that lay white before them.

Thornton hefted his rifle and met the German's angry gaze with steady eyes. "The Rorvan could hardly have known that lizard would be right in our path," he said.

"No, but it vas a chance for dem to get rid of vun of us." Von Osten hunched

his shoulders under the inadequate jacket. "Iss too many t'ings vat don't fit togedder. Dere iss somet'ing fake about dese aliens, and I say ve should shoot down all but vun and beat de trut' out of him."

"Matter of language difficulty there," said Thornton dryly.

"Lengvitch, hah! Dey just don't vant us able to talk vit' dem. No lengvitch can be so hard like dey make out. Ven dey don't vant to answer a qvestion, dey just tell soft-head Avery, '*Versteh' nicht*,' or dey jabber nonsense at him and he t'inks it iss some new trick of deir lengvitch. No, dey talka to him eassy enough if ve make dem vant to."

Von Osten reached out and tapped the Martian's bony chest. "And vy are dey leading us like dey do? I haff looked at our own maps. Vould be much qvicker and eassier to cross fart'er sout' and den follow de coastal lowlands nort'. I t'ink dis talk about skirting dangerous land iss so much bull roar. I t'ink dey are giffing us a royal runaround."

Thronton shrugged. "Frankly, I suspect the same. But why approach me about it?"

"You iss de only vun I can trust. Avery iss a fool, Lorenzen is a veakling, Gummus-lugil vould refuse to help just because it iss my idea. You and I can maybe do somet'ing."

"Hm-m-m" Thornton rubbed his chin; the unshaven bristles felt scratchy. "Perhaps I can. But I don't want to rush into anything. Quite possibly the Rorvan intended to murder all of us. It is the easiest way to keep man off their planet. If the *Hudson* also fails to return, there will probably be no third expedition, and maybe the aliens suspect as much. But don't forget, they have to get rid of base camp too, which would be doubly alert if all of us disappeared. And the spaceship—how about it? How did they dispose of the *Da Gama?* It should have been in its orbit to this day, even if they lured the skeleton crew down somehow—"

Von Osten scowled. "I t'ink dey haff powers dey are not showing us. Maybe spaceships of deir own."

"While their warriors are armed with flintlocks? Don't be a fool!"

The German's sun-darkened face turned red. After a moment, he said quietly: "Pleasse vatch your tongue. I vish to vork togedder vit' you, but not if you haff no manners. Haff you neffer t'ought maybe dose muskets are part of de game? If ve t'ought dey had not'ing better, it vould put us off our guard—"

Thornton whistled. Suddenly he turned. "Come on, we're supposed to be hunting."

"But my idea?"

"I want to think about it. I'll let you know."

They felt their way cautiously along the ledge that wound up the mountain face. Now and then they stopped to scan the harsh scene with field glasses. Dry snow scudded along the crags, but there was no sign of life. Thornton felt hunger gnawing in his belly, and suppressed the awareness. He had no business now complaining about the flesh.

If the Rorvan were *not* so primitive as they claimed to be, it opened up a whirl of nasty possibilities. If they were anywhere near the interplanetary level of technology, they would have been able to detect the *Hudson* as she approached; and in her equatorial orbit, she would make such frequent transits

of Sister and the suns that the smallest telescope could spot her. Even if the Rorvan were only at the gunpowder stage, it was probable that they had telescopes. But if they were further along yet—then they could live underground, synthesizing their food; the custom could have grown up during a period of atomic wars. They could wipe out the camp and the ship with a couple of long-range guided missiles. Why hadn't they done so before? Maybe they wished to learn all they could first, and appearing in the guise of primitives was certainly a good way to disarm suspicion.

Thornton shook his head. It still didn't quite make sense, there were too many loose ends and unanswerable questions. But he had to assume von Osten was essentially right. He dared not do otherwise. And if so—what to do? A quick blast with an automatic rifle, to wipe out the Rorvan in camp; maybe saving one for questioning—the commissars had taught humanity how to get truth out of any creature which could feel pain. A call to the camp, a quick return of all personnel to the *Hudson*, retreat into outer space—And then what? Troas would still be a mystery. He couldn't see a Solar Patrol making up a punitive force—but it wouldn't have to. It couldn't refrain, lest some day the Rorvans strike out of the sky at Earth.

Avery would scream to high heaven, pointing out that this was sheer unprovoked murder; he would doubtless lodge criminal charges when they got back to Sol. Lorenzen would, somewhat reluctantly, back him. Gummus-lugil was an uncertain quantity. How about Hamilton? The captain might put Thornton and von Osten in irons and stay here regardless; his caution never stood in the way of his duty as he saw it.

I have a duty, too.

It might be best to stage a mutiny, to gun down all those humans who would not string along. And that would certainly mean a trial when they got back to Sol, prison, psychiatrists turning his mind inside out—Thornton's wife and children would weep, alone in their home on Mars, and bear themselves with bitter pride in the face of their neighbors.

But the Rorvan were not human; the Noachian clergy doubted that any aliens even had souls, and in all events they were surely heathen.

Thornton knew what an anguished wrestling with himself he must have before decision came. But already he thought he knew what the decision would be.

"Dere! Ofer dere!"

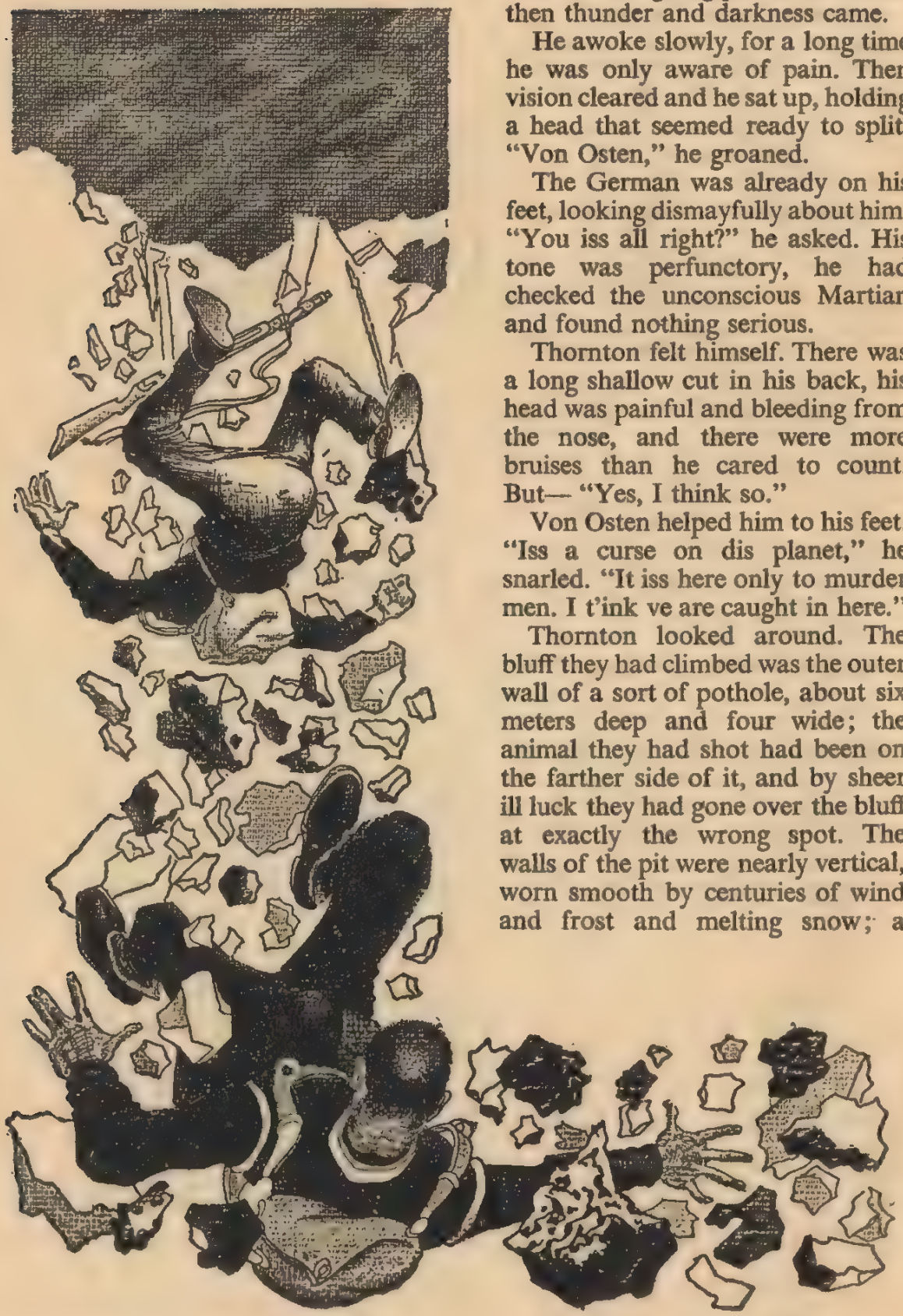
Thornton lifted the field glasses at von Osten's whisper. High above them, peering over a massive jut of rock, was a horned head—game!

The two rifles cracked almost as one. The beast screamed and was gone. Furiously, Thornton began to run, leaping over stones and splits in the ledge. His breathing was fire in his lungs, but he had to catch that animal before it got away, he had to!

The upper ridge bulked in front of him. He scrabbled, clawing himself fast to the rock. Von Osten grunted at his side, grabbing for handholds. It was like going over a fence. They reached the top.

And went over!

The moment was too swift for understanding. Thornton had a brief wild knowledge of falling, something smote him on the back and ripped his flesh



open, he heard the angry whizz of a loose rock going past his ear, and then thunder and darkness came.

He awoke slowly, for a long time he was only aware of pain. Then vision cleared and he sat up, holding a head that seemed ready to split. "Von Osten," he groaned.

The German was already on his feet, looking dismayfully about him. "You iss all right?" he asked. His tone was perfunctory, he had checked the unconscious Martian and found nothing serious.

Thornton felt himself. There was a long shallow cut in his back, his head was painful and bleeding from the nose, and there were more bruises than he cared to count. But— "Yes, I think so."

Von Osten helped him to his feet. "Iss a curse on dis planet," he snarled. "It iss here only to murder men. I t'ink ve are caught in here."

Thornton looked around. The bluff they had climbed was the outer wall of a sort of pothole, about six meters deep and four wide; the animal they had shot had been on the farther side of it, and by sheer ill luck they had gone over the bluff at exactly the wrong spot. The walls of the pit were nearly vertical, worn smooth by centuries of wind and frost and melting snow; a

small hole in the bottom must lead to a channel that drained off the water.

He walked unsteadily about, examining the edges of the trap. Von Osten, who had suffered less, made several increasingly frantic attempts to climb out, but finally gave up. There was no way to do it without equipment they didn't have.

"Two more for de Rorvan," he said hoarsely.

"They couldn't have known—"

"Dey haff led us t'rough dangerous country. Chance has done for dem vat dey oddervise vould haff done for demselves."

Thornton went to his knees and prayed. He didn't ask for help; whether he lived or died, that was God's will. He felt more composed when he was through.

"The others will come looking for us when we don't return tonight," he said. "They know approximately the route we followed."

"*Ja*, but iss a hell of a big territory to search, and ve vill not last very long in dis cold." Von Osten hugged himself and shivered.

"We'll have to fire shots at intervals, and take our chances of starting an avalanche. But we may as well wait a while with that, nobody will be coming this way for hours yet. Here, break out the first-aid kit and bandage me a little, will you?"

After that there was nothing to do but wait.

It grew colder when the blue sun set. Shadows began to fill the pit, and the air was like liquid. There was no breeze down here, but the men could hear the

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thin cold harrying of the wind up around the edge of the hole. They tried to exercise to keep warm, but there was no strength in them.

After the second sunset, they huddled together in an abysm of darkness, under the keen merciless blink of stars. Now and then they dozed, and woke with a shudder. They were only half conscious, time stretched horribly for them and the night was full of fleeting visions. Once Thornton thought he heard someone calling him, and started nearly awake; the voice rang hollowly down the long bare slopes, crying that he had sinned, and he knew it was not one of the searchers.

The long night wore on. When the first stealthy gray slipped across their little patch of heaven, they felt a dim surprise that they were still alive.

Now and then they curled stiff fingers around their guns and fired into the air. The echoes howled around them, and Thornton recalled the topography of this region with an effort. It was hard to think, but he suspected the surrounding cliffs would prevent sound from carrying very far. They might never be found, their bones might lie here till the double star was ashen.

The first sun climbed higher. They couldn't see it yet, but it melted the night's frost and a dozen bitter trickles of water ran down into the pit. Von Osten rubbed a frozen toe, trying to bring life back to it. Thornton sought to pray, but words wouldn't come, it was as if God had forgotten him.

Full sunlight was blazing into the pit when the Rorvan came. Thornton saw them peering over the edge and didn't recognize them at first, his mind was vague and stupid. Then knowledge came and he snapped to wakefulness with a jerk.

Von Osten spat an oath and hefted his rifle. "*Mörderische Hund!*" Thornton knocked the weapon down just in time.

"You idiot! They're here to rescue us!"

"Are dey, now? Dey're here to see ve die!"

"And what good will it do us to shoot them? Give me that gun!" They scuffled feebly. Three Rorvan stood on the pit's edge and watched them. Wind ruffled their fur, but the masked faces were utterly impassive and they said nothing.

Thornton got the rifle away from von Osten and looked up again. There was no sign of the aliens. It was like a cold hand around his heart. So simple, so easy. If the Rorvan meant them all to die, here were two men murdered for them already. They need only report that they had found no trace of the missing ones.

So easy, so easy—Thornton felt his mind buckling. He felt death within himself, he was doomed to freeze and die here, thirty thousand light-years from his home, and God had turned his face from Joab Thornton. He bowed his head, feeling tears harsh in his eyes. "Thy will be done."

And then the Rorvan were in sight again. They had a rope, and one of them took a turn around his body and the other was climbing down it into the pit. Down to rescue the humans.

XIII

Beyond the pass, there was another steep drop, cliffs falling terrifically into a remote glimmering sea. It reminded Lorenzen of parts of the California

coast—the savage splendor of mountains, the grass and shrubs and low dark-leaved trees along their slopes, the broad white beach far below; but this range was bigger and sharper. Newer—he remembered Fernandez pointing out that the glacial era on Troas was due to a recent period of tectonic activity. The huge satellite probably made diastrophism here a more rapid process than on Earth. Lorenzen thought of the little geologist and his grave. He missed Miguel.

A good thing that Thornton and von Osten had been saved. He remembered a long talk he had had with the Martian afterward; Thornton had told of his plans, in short harsh sentences wrenched out by an inner need to confess to someone, and admitted he had been wrong. For if the Rorvan intended murder, why should they have rescued him? Lorenzen said nothing to anyone else about the conversation, but added the question to his own list.

Von Osten was still sullen and hostile to the aliens, but had obviously shelved his own schemes. Thornton, shaken by his experience, had swung the other way, to a trust of the Rorvan almost as great as Avery's seemed to be. The Martian was now brooding over the theological problem of whether or not they had souls; he felt they did, but how to prove it? Gummus-lugil slogged cheerfully and profanely along the interminable trail. Lorenzen felt very lonely these days.

He was making progress with the language. He could almost follow the talk of Avery and Djugaz, nearly enough to be sure that it was not just a lesson. The psychman remained blandly smiling, turning all questions with a deftness that left Lorenzen stuttering and incoherent. Yes, of course he was getting along with Djugaz, and the Rorvan was telling him some interesting things about his own race. No, he didn't want to take time out and teach Lorenzen what he knew; later, John, later, when we can all relax.

Almost, Lorenzen was ready to lay down the burden. Give it up, take Avery's word at face value, stop thinking and worrying and being afraid. There would be an answer to all questions in due time. It was no concern of his—

He stiffened himself and bent bleakly to the job. It did not occur to him how much he was changing himself, how little stubborn and aggressive he had been before this. Apart from his research, he had been like most men, content to let others do his thinking and deciding for him; he could never quite go back to that.

The climb down to the sea was grueling, but took only a couple of days. Once they were on the flat coastline, it was like a vacation, Avery said Djugaz had told him it was only a few more days to their goal.

At this point of the shoreline, the coastal plain hardly deserved that title: it narrowed to a kilometer-wide beach, a thin strip of grass and trees, and then the high rocky bluffs at the sheer foot of the mountain. The strand was also Californian, a great stretch of fine sand piled into tall dunes and scudding before the salt wind. But Earth had never seen a surf as furious as that which formed and roared at its edge, nor a tide so swift and deep as the one which marched up almost the whole width of the beach twice a day. There didn't seem to be any game here, but the party could live off herbs and wild beans for a while.

Lorenzen felt a tautness rising within him as the kilometers fell behind. A few more days, and then—the answer? Or more questions?

Death guested them again before they reached an end of wandering.

The tide was coming in near the first sunset that day, when they came to a point where the hills fell directly into the sea. Bluffs and wind-gnawed boulders lay half-buried in the sand, making a low wall across their path; beyond, the beach curved inward, a long narrow loop at the foot of a ten-meter cliff, forming a bay. The water here was scored with the teeth of rocks thrusting out of its surface; a kilometer from the beach, the mouth of the bay was white violence where the sea thundered against a line of skerries.

Lorenzen paused on the top of the wall, looking uneasily ahead at the thin strip of sand. "That stuff is under water at high tide," he said. "And the tide's coming in."

"Not that fast," said Gummus-lugil. "It'll take less than half an hour to get across, and we won't even get our feet wet. Come on!" He jumped back down to the strand, and Lorenzen shrugged and followed. The Rorvan were already ahead of them, moving with the light rippling grace which had grown familiar in these weeks.

They were halfway across, hugging the foot of the cliff, when the sea broke in.

Lorenzen saw it as a sudden white curtain rising over the barrier. The roll of surf became a rising cannonade, ringing and screaming between the stones. He sprang back as the water level rose and rushed in across the beach.

A wave toppled over the outer skerries and came in with a blinding speed. Lorenzen yelled as its teeth closed around his knees. Another was on its back, green and white fury, spray exploded in his face and the sea got him around the hips. He fell, the water sheeted over his head, he rose with a howl and a fist seemed to batter him down again.

Rising, striking out wildly, he was whirled outward by the undertow. His boots dragged at him, yanking him beneath. The waters bellowed and tossed him back, against the white rush of surf at the cliff's edge.

Clawing for a hold in the churning water, he looked about him through half-blinded eyes. There, up ahead in the fury, a rock rising— He twisted, fighting to stay above water. Briefly, a Rorvan was whipped by him, he heard a dying scream and then the sea snarled up to shake the world and he went under again.

Up . . . over . . . strike, kick, reach— The slippery stone would not take his hands. A wave grabbed him and dashed him away—then back, over the rocks he closed his arms around something and hung on.

The waters whooshed about him, he couldn't see or feel or think, he clung where he was and lay blind, deaf, dumb, half dead, only a barnacle will to survive kept him there.

And then it was over, the wrathful waters sucked back with a huge hollow roar. He fell waist-deep and scrambled for the wall cutting off the bay. Before he got there, the sea was coming in again, but he made it. A wave sloshed after him as he climbed the wall. Almost hysterically, he fled from it, collapsing on the grass above high-water mark. He lay there for a long time.

Presently strength and sanity returned. He got up and looked around him. The wind tossed smoking spindrift into his face, and the noise of the sea drowned his voice. But there were others, a group gathered, they stood mutely together and looked with wildness at each other. Human and Rorvan eyes met in a common horror.

Slowly, then, they took stock. Three missing—Gummus-lugil, Alasvu,

Yanvusarran. Silish groaned, it sounded like the anguish of a man. Lorenzen felt sick.

"Let's look around." Avery had to speak loud, but it came to their ears as a whisper under the anger of the sea. "They may be . . . alive . . . somewhere."

The tidal bore was receding, and von Osten climbed the wall and peered over the bay. Two forms stood on the opposite side and waved feebly at him. The German whooped. "Gummus-lugil and vun oder iss still alife! Dey lived!"

Silish narrowed his eyes, squinting across the sunset blaze that shone off the waters. "*Yu Yanvusarran.*" His head drooped.

"What did it?" breathed Avery. "What was it that hit us?"

"The p-p-place here is a ro-o-ost," stuttered Lorenzen. "The c-conformation of the bay, a s-s-steep slope of the bottom . . . it makes th-th-the tide come in like all the legions of hell. We've got s-similar things on Earth . . . and here the t-t-tide is so much stronger— I-i-i-if we'd only known!"

"De Rorvan!" Von Osten's lips were white. "Dey knew! It vas a plan to kill us all—!"

" D-don't be more of a fool than y-yyou can help," said Lorenzen. "It got one of them and nearly got the rest. It was an accident."

Von Osten looked at him in surprise, but shut up.

The tide dropped swiftly. They crossed the bay by twilight, to join Gummus-lugil and Alasvu. The Rorvan was collecting driftwood for a campfire, and the Turk was reporting the affair on his miraculously undamaged radio. There was no sign of Yanvusarran, he must have been swept out to sea, or maybe his corpse rolled at the foot of the barrier reef and waited for the fish.

The Rorvan set up a low keening. They stood in a line, holding their hands out to the water. Lorenzen listened to the funeral chant, and was able to translate most of it. "*He is gone, he is faded, he walks no more, no longer for him the winds and the light, but his* (memory?) *shall live within us*—" Their grief was genuine enough, thought the astronomer.

Darkness came, walling in the little circle of firelight. Most of the party slept, exhausted; one Rorvan guard prowled up and down, and Avery and Djugaz were sitting up talking as usual. Lorenzen stretched himself out near them and feigned sleep. Maybe tonight, he thought, he would get a clue. He hadn't been able to make much sense out of their talk before, but sometime soon he must catch on to the knack, and then his vocabulary would be large enough—

He had it!

Avery spoke, slowly and heavily: "I (unknown) not make-think others. Some not (unknown) laughing (?) with what I-say."

The trick was to cast what was heard into normal English, filling in the meanings of unfamiliar words from context, and to make the translations fast enough so that he didn't lose the reply. "I hope this does not make the others think (or: suspicious). Some are already not very happy with what I tell them."

Djugaz answered gravely: "Swiftly (unknown) theirs you, (unknown) time (?) to *Zurla* we-get see past shadow (?) they." Lorenzen's mind raced, unnaturally clear: "You must swiftly disarm their suspicions, lest when we get to the *Zurla* they see past the shadow (or: deception)."

"I do not think they will. How could they? And after all, I have the weight of authority (?), they will listen to me. At worst (?), that can be done to them which was done to the first expedition (?), but I hope (?) that will not be necessary. It is not a pleasant (?) thing to do."

A harsh flare of fanaticism: "If we must, then we must. There are larger issues (?) at stake than a few lives."

Avery sighed and rubbed his eyes like a man driven to immense weariness. "I know. There is no turning back. Even you do not realize how much is involved (?)." He looked up at the high cold radiance of the stars. "Perhaps (?) all of that—the entire universe (?)—all time and all space." There was a croak of pain in his voice. "It is too much for one man!"

"You must."

"Sometimes I am afraid—"

"I, too. But it is more than our lives (?)."

Avery laughed without humour. "*You* think this is an enormous issue! I tell you, Djugaz, you do not begin to understand how much—"

"Perhaps not." Coldly: "But you depend (?) on me as much as I on you—possibly more. You will follow my lead (?) in this."

"Yes. Yes, I will."

Lorenzen could not follow the rest of the talk; it went into generalities, abstract concepts for which he had no word. But he'd heard enough! He lay in the sleeping bag and felt cold.

XIV.

The mountain range swung suddenly inland, at the same time growing lower gaining an easier slope. Here there were rolling grasslands, trees and meadows and running streams between the hills. The Rorvan hastened their steps.

Another of their race, armed and dressed much like themselves, met them. There were whistling cries of recognition; Djugaz and Silish ran up to him and conferred swiftly, then the newcomer nodded and ran off.

"He's going to spread the news," said Avery after a talk with Djugaz. "The village will want to welcome us. They're a pretty friendly people, these Rorvan."

"Hm-m-m." Gummus-lugil gave him a close look. "You seem to be kind of familiar with their language after all."

"Yes. In the last few days, I finally got the key to it, and everything fell together all at once. Fascinating semantics it's got. I'm still not an expert by any means, but I can understand ordinary conversation."

"So? Who are these boys with us, then?"

"They are a delegation to another town, returning home after a . . . business conference of some sort; I can't quite get the exact meaning there. They happened on us and realized pretty quickly what we must be. Their knowledge of astronomy is good, about like our eighteenth century, and Djugaz quickly grasped what I told him about the true structure of the universe—its size and so on."

Lorenzen couldn't refrain from asking: "Where are their observatories? How did they detect the finite speed of light? They could hardly use Römer's method in this system and—"

"I don't know yet." Avery looked annoyed. "Don't be so dogmatic, John. Does every science have to develop the same way as ours did?"

Lorenzen shut up. No sense giving himself away. No! It could mean a knife between the ribs.

"Underground towns, as we suspected earlier," went on Avery. "That custom seems to have grown up in the past couple of thousand years, when the climate was colder than it is now. Originally, I suppose, it was merely because a dugout requires less building material and is easier to heat. but now it's become almost a matter of morality, like our taboo on public nudity."

"And dey haff farms underground, too?" Von Osten frowned, trying to understand.

"No, they never developed agriculture—so much of the wild vegetation is edible the year around. Then, too, they have herds of grazing animals for meat, induced to remain in the vicinity by some means I don't yet comprehend. Djugaz gave me the word for it, but I can't find a corresponding concept in any human language."

Alasvu was listening to the talk, his head cocked on one side, as if he knew what was being said. Doubtless he had the drift of it, thought Lorenzen. There was a wicked mirth in the amber eyes.

"It's wonderful that they were still able to become civilized," said Thornton. "A gifted race— Do you know how many of them there are?"

"Quite a large population, I gather—at least a hundred million, though none of our party knew the exact figure. This is just a small village, a hamlet, we're going to; but then, they don't have any really big cities like us, they spread out more uniformly."

Lorenzen looked at the psychman. The weeks of wandering had leaned him down and burned his skin dark, but still there was nothing impressive to look at, still he was a small round man approaching middle age, soft-spoken, genial, everything about him said he was dull but steady, mildly benevolent, a little timid— And he was party to a scheme which juggled with the destiny of stars! There was some goal which made him so ruthless that the fate of two ships and the will of seven billion human beings was nothing. Lorenzen shrank a little closer to the stolid, comforting bulk of Gummus-lugil. He'd just about have to let the Turk know, if no one else—

One of the mountains hemming in the eastern horizon thrust long roots out toward the sea. As the party approached one of these, it appeared as a low escarpment fronting a giant hill. The surrounding land was bare, tracked and trampled by many feet. Trees grew thickly before the cliff, some of them ancients almost three meters tall, and out of this grove the Rorvan began coming.

They moved quietly, saying little, none of the babbling excitement a human crowd would have shown. There must be some fifty or sixty of them, estimated Lorenzen, equally divided between male and female. The latter were dressed in kilts and sandals; the four breasts were not very human looking, but gave the final proof that this race was mammalian. Some of the males carried muskets, the rest were unarmed. They closed in on the humans, in a friendly enough way. A purr of talk rose from them.

"How come no young?" asked Thornton.

Avery put the question to Djugaz, and replied after a moment: "The children

all go into special . . . crèches, I guess you'd call them. I gather the family here has a radically different structure and function from ours."

Pushing from the grove, the throng came to an entrance in the hill—a great artificial doorway, ten meters wide and three high. Lorenzen forced down a shudder as he walked through it—would he ever see sunlight again?

Thick columns of rammed earth supported a broad corridor running into the hill with many branches leading off to the sides. The air was cool and fresh, Lorenzen saw ventilator grilles in the walls. "Good pumps, then," commented Gummus-lugil. "And they use electricity." He nodded at the fluorescent tubes which lined walls and ceiling and gave a steady bluish light. "Their technology can't be entirely on an eighteenth-century level."

"You wouldn't expect it to be," said Avery. "A lot of engineering advance in our own history has been sheer accident. If the early researchers had investigated the Crookes tube more thoroughly, we might have had radio and radar before 1900."

The corridor was quiet, save for the murmur of the air blowers and the shuffle of many feet. It sloped gently downward for a good half kilometer. Glancing in the side tunnels, Lorenzen saw doorways presumably leading into rooms or suites.

The main passage opened on a great cubical cavern. This was lined with entrances screened off by tapestries that seemed to be of woven fiber. "Downtown," said Avery with a wry smile.

They don't seem to have much artistic sense," said Lorenzen dubiously. The whole place had a depressingly barren air to it, neat and clean but without sign of decoration.

Djugaz said something and Avery translated: "This is quite a new settlement. They haven't had time to fix it up yet. It's partly a colony, partly a military post; I gather that the females fight as well as the males."

"So dey are not united here?" rumbled von Osten.

"No, not quite. I've already learned that the continent is divided among several nations. Currently they're at peace and coöperating, but it wasn't so long ago that they had a terrific series of wars and the armies are still maintained at strength."

The German's eyes gleamed. "Dey could maybe be placed off against each oder."

"I doubt it—even if we would be morally justified in such a course," said Avery. "I rather imagine they know as much about the *divide of impera* game as we do."

One of the Rorvan made gestures at a pair of doorways, talking fast. "We're honored guests," said the psychman. "We're invited to make ourselves at home here."

Inside, the apartments had the same bleak military look: each had two rooms and a bath, furnished with a few low concrete couches and stools; that was obviously an easier material to work with than the native wood. But there was hot and cold running water, a flush system, a kind of soap. Apparently the village had a communal kitchen.

Avery disappeared for a while, talking with Djugaz and the villagers who seemed to be local leaders. Von Osten looked around the suite in which the

other humans waited, and sighed gustily. "Iss dis all ve haff come so far to see?"

"I'd like more of a look," said Thornton. "Their apparatus, the general layout of the town, their daily lives—it should be interesting."

The German grunted and sat down. "To you, maybe. For me, I haff come t'irty t'ousand light-years and seen not'ing vort' de trip. Not efen a good fight at its end."

Gummus-lugil took out his pipe and got it going. His face was moody. "Yeh. I have to agree. Unless these Rorvan will actually let us settle here, the trip has been for nothing. We can't take over a planet from a hundred million well-armed natives with a high grasp of military principles. They could raise merry hell with us, just using what they have, and I'll bet they could soon be copying our own weapons, too. Unless we could bluff them . . . but no, the bluff wouldn't last, they'd catch on fast enough and massacre the colonists."

"Dey could be conquered!"

"At what expense? Spending how many lives? And all for the benefit of the few million people who could be shipped here. They don't command that many votes! Parliament would never agree."

"Well . . . the Rorvan may still be persuaded—" Thornton said it as if he didn't believe it himself. Nobody did. A race capable of building electric generators wasn't so stupid that it would allow several million aggressive aliens to settle on its home world. It could easily foresee the consequences.

Avery came back after an hour or so. He was wearing a poker face, but his voice sounded tired: "I've been talking with the local bosses, and gotten messages sent to the government of this nation—they have a few telegraph lines, it's something new for them. That government will doubtless communicate with the others. We're asked to stick around for a while till they can send their scientists and so on to interview us."

"What's the chance of their letting people settle here?" asked Gummus-lugil.

Avery shrugged. "What do you think? It'll have to be officially decided, of course, but you already know the answer as well as I."

"Yeh. I guess I do." The engineer turned away. His shoulders slumped.

XV

The rest of the day was spent in a guided tour of the village. There was quite a bit to see. Gummus-lugil was especially interested in the power station, which he was told drew its energy from a hydroelectric plant in the mountains, and in the small but well-equipped chemical laboratory. Von Osten took a good look at the arsenal, which included some large-sized mobile cannon firing explosive shells, a set of flame throwers, grenades, and a half-built experimental glider which ought to work when it was finished. Thornton leafed through some printed books and inquired, through Avery, about the state of Rorvan physics—which had apparently gotten as far as Maxwell's equations and was working on radio. Lorenzen tried hard to keep up a show of interest, and hoped he was succeeding. But every now and then one of the aliens gave him a sidelong look which might mean nothing or might mean death.

In the evening there was a banquet, the whole village gathered in a decorated mess hall for a series of excellently prepared dishes and the entertainment of musicians. The town commander made a mercifully short speech on the "hands-across-space" theme, and Avery replied in kind. Lorenzen faked boredom as well as he could, as if he didn't understand a word of it. Underneath, he was churning with worry. All that day the farce had been kept up. The Rorvan had asked the expected questions of Avery—about his race, its history, science, beliefs, intentions—well, that would fit in with the astronomer's deductions of the truth; the aliens would still have a normal curiosity about man. But why this solemn rigmarole of talks which presumably only Avery would understand? Was it for his, Lorenzen's benefit? Had Avery warned them that he might know more than he let on? And if so, how much of what he knew did Avery know he knew?

This was getting worse every minute, questions within questions. And what to do, what to do? Lorenzen glanced down the long bright table. The Rorvan were there in their Sunday best, barbaric splashes of color against the drab, soiled gray of the humans' hiking clothes—rank upon rank of them, face after face, each one mobile and smiling and completely unreadable to him. What did lie behind those golden eyes? Was he sitting at table with the real masters of the universe? Self-appointed gods playing at humble peasant and soldier—When the Rorvan smiled, you could see the long fangs in their mouths.

It ended, finally, after a polite nightmare of hours. Lorenzen was sweating when he got up, and he couldn't keep his hands from trembling. Avery gave him a look which showed only sympathy—but what was *he* thinking? Was he even human? Surgical disguise, synthetic thing—what lay under the round bland mask of Avery's face?

"You don't look well, John," said the psychman.

"I feel . . . rather tired," mumbled Lorenzen. "I'll be all right after a good night's sleep." He yawned elaborately.

"Yes, of course. It has been rather a long day, hasn't it? Let's toddle bedwards."

The party broke up in murmuring, soft-footed knots of aliens. A guard of honor—or was it just a plain guard?—shouldered arms and marched behind the humans on the way to their apartments. They had two adjoining ones, and

Avery himself had suggested that Lorenzen and Gummus-lugil should take one, the other three the remaining one. If they were to be here several days, that was a tactful measure to avoid a clash between the Turk and von Osten, but—

"Good night, boys. See you in the morning. 'Night."

Lorenzen drew the curtain that shut his place off from the street. Inside, it was a barren cave, coldly lit by the fluoros in the ceiling. There was a great sudden quiet, this was not a human town with its restless life. Gummus-lugil spied a bottle on the table and reached for it with a delighted grin. "Some of their wine—nice of them, and I could sure use a nightcap." He pulled out the stopper with a faint *pop*.

"Gimme that . . . I need it bad—" Lorenzen almost had the bottle to his lips when he remembered. "No!"

"Huh?" Gummus-lugil's narrow black eyes blinked at him. "All right, then, hand it over here."

"No!" Lorenzen set the bottle down with a thud. "It might be drugged."

"Huh?" repeated the engineer. "You feel O.K., John?"

"Yes." Lorenzen heard his own teeth clapping in his head. He stopped and drew a long shuddering breath. "Listen, Kemal. I've been hoping to get you alone. I want to . . . tell you something."

Gummus-lugil ran a hand through his coarse dark hair. His face grew wooden, but the eyes remained watchful. "Sure. Fire away."

"While I'm talking," said Lorenzen, "you better check your pistol and rifle. Make sure they're loaded."

"They are. But what—" Gummus-lugil started as Lorenzen flipped the curtain aside and looked out into the street. It was empty, utterly dead and silent in the chill electric radiance. Nothing stirred, no sound, no movement, it was as if the village slept. But somewhere there must be wakeful brains, thinking and thinking.

"Look here, John, we'd better let Ed have a look at you—"

"I'm *not* sick!" Lorenzen whirled about and put his hands on the Turk's shoulders and shoved him to the bed with a strength he hadn't known was in him. "All I want you to do is listen to me. Then when you've heard me out, decide if I'm crazy or if we really are in a trap—the same trap that got the *Da Gama*."

Gummus-lugil hardly moved, but his mouth grew suddenly tight. "Talk all you want," he said, very quietly.

"All right. Hasn't anything struck you about these . . . Rorvan? Hasn't there been something strange about them, this whole time we've known them?"

"Well . . . well, yes, but you can't expect nonhumans to act like—"

"Sure. Sure, there's always been an answer, for every question we raised." Lorenzen was pacing up and down, his fists clenching and unclenching. Oddly, in this moment his stutter had left him. "But just think over the questions again. Consider the weirdness of it all.

"The Rorvan group, traveling on foot across a huge empty plain, just *happens* to find us. Improbable, isn't it? They are the dominant race, the intelligent one, they are mammals, and there are no other mammals on this planet. An evolutionary biologist would wonder about that. They live underground and have

no agriculture, seem to make no use of the surface at all except for hunting and herb-gathering. A moral code, we're told—but no morality lasts that doesn't make *some* sense, and this one is ridiculous. Our guides fail to recognize a type of venomous lizard which is probably widely distributed and certainly a menace to them; even if they personally never saw one before, they should surely have heard about it, just as any American knows what a cobra is. Then, even worse, they get trapped by a tidal bore and lose one of their number—*within sixty kilometers of their own home!* They didn't know about the damned thing!

"I tell you, the Rorvan are fakes! They're playing a game! They're no more natives of this planet than we are!"

Silence. It was so complete a silence that Lorenzen could hear the remote humming of the village power station. Then his own heart began to beat so furiously that it drowned out all but Gummus-lugil's: "If you're right—"

"Keep your voice down! Of course I'm right! It's the only picture which fits all the facts. It explains, too, why we were taken the long way around to this place. They had to build it first! And when the 'scientists' and 'government representatives' arrive to greet us—they'll be from the Rorvan spaceship!"

Gummus-lugil shook his head, slowly and amazedly. "I never thought—"

"No. We were rushed along, with smooth, pat explanations every time we did pause to wonder. That phony language barrier helped a lot, too; we naturally shelved our questions—in our own minds as well—till they could be answered directly. It's not a difficult language at all. I've learned the basics of it myself, once I decided that it was *not* hard. When I first tried to study it, I was given a lot of confusing data—faked! There's no more variation in the name of an object, for instance, than there is in English or Turkish. Once I'd thrown out the false information—"

"But why? Why are they doing this? What do they hope to gain—"

"The planet, of course. If we go home and report that there are highly civilized natives, Earth will lose interest in Troas and their own people can come here in droves. Then it'll be too late for us, they'll *have* the planet and we won't be able to get them off it."

Gummus-lugil stood up. There was a grimness in his face; he had changed his mind about a lot of things in a few minutes. "Good work, John! I'm pretty sure you're right. But . . . d'you think they intend to murder us?"

"No. They rescued Joab and Friedrich, remember, whom they could just as easily have left to die. I don't think they'll kill us unless they suspect we know the truth. Our negative report at home will be of more value to them than our disappearance."

"Why—" Gummus-lugil grinned, a savage white flash of teeth in the broad swarthy face. "Then it's simple. We just string along with them till we get back to our camp and then tell—"

"But it's *not* that easy, Kemal! Avery is in cahoots with them!"

XVI

This time the engineer said nothing, but his hand dropped to the gun at his belt as he waited.

"Avery . . . little old Ed Avery," said Lorenzen. There was a sick laughter in him. "*He* faked those language data. He supplied most of those answers to our questions. He learned Rorvan and sat up late at night talking with them. I heard them—" He sketched out the conversation on which he had eavesdropped.

"You mean the *Da Gama* case is . . . related to ours?" Gummus-lugil's voice was thick.

"It fits in, doesn't it? The first expedition disappears. The second endures a string of troubles which would have made anyone but a bunch of near-fanatics like the Institute's directors quit. The government helps recruit personnel for the trip, and we get the most badly selected, conflicting, inefficient crew which ever took a ship to space. Avery is along as psychman and does nothing to mitigate those conflicts. Avery is also in an official position, one of the advisors on whom Parliament and the people are coming to lean more and more. And when we bull through in spite of everything, the Rorvan show up. And if we come home and don't make a negative report on Troas . . . well, the *Da Gama* vanished . . ."

Sweat gleamed on their faces as they stood confronting each other. They were breathing hard, and Lorenzen was beginning to shake again.

"But the *government*—" It was almost a groan from Gummus-lugil.

"Not the official government. Parliament operates in a goldfish bowl. But the psychocrats, the advisors, the quiet unassuming power behind the throne—they have men everywhere. One Patrol ship, manned entirely by men sworn to their service, would have been enough to take care of the *Da Gama*. Will be enough for us."

"But why?"

"I don't know. Maybe I'll never live to know. But you could imagine an older civilization than ours—maybe the Rorvan are the real bosses of the galaxy, maybe the psychocrats on Earth are their tools, or maybe both are cat's-paws for some other planet. They don't want man in interstellar space—"

There was another silence while they thought of a billion suns and the great cold darknesses between.

"All right," said Gummus-lugil. "What can we do? Now?"

"I don't know," said Lorenzen desolately. "Maybe we should wait, play for time, till we can get Captain Hamilton alone and talk to him. But on the other hand, we may not be allowed time—"

"Yeh. Anything could happen, couldn't it? If somebody . . . something . . . learned what we know— Or maybe the Rorvan won't give us a chance, maybe they'll decide not to risk our figuring things out on the way home and will blow up the works while Hamilton is still unsuspicious." Gummus-lugil looked at the radio set where it stood in a corner. "I doubt if we could call from here. There's enough metal in these caves to shield us off, probably. We'll have to go outside."

"All right." Lorenzen went over and picked up his rifle. "Now is as good a time as any, I guess." There were robomonitors at the camp set to ring an alarm and start recording when a call came from the portable set.

The astronomer peered out into the street again. Nothing moved—silence, graveyard silence. Under the violent thudding of his heart, he wondered if they could go out and make their call and come back undetected.

But if not—that had to be risked. That, and a bullet in the belly, however frightened he was. His own sweat stank in his nostrils, it was hard to keep from shaking, but some jobs had to be done. It was more than the possession of Troas. The Solar System, all humankind, had to know who its secret masters were, or there could be no peace for John Lorenzen in all his remaining days.

Gummus-lugil thrust his arms through the shoulder straps of the transceiver and stood up, grunting. He had a rifle in one hand, and a knife struck in his belt. The preliminaries were over, now they were playing for keeps.

They stepped out into the street. Their eyes wandered to the curtained entrance of the adjoining apartment—Avery was in there. It would have been good to have Thornton and von Osten along, but they couldn't risk waking the man or creature or thing who called himself Edward Avery.

Down the long row of doorways, their hushed footfalls seeming thunder-loud; out of the central cave, slowly upward through the silent empty tunnel to the open sky—

A Rorvan stepped out of a side tunnel. He had a musket, and it swung to cover them. The yellow eyes blazed with sudden alarm, and he rapped out the question: "Where are you going?"

Lorenzen checked himself just before answering; he wasn't supposed to know the language. He smiled, spreading his hands, and walked closer. The Rorvan's gun wavered. If they were unsuspecting guests— Then decision came, and he waved them back.

"Of course," whispered Gummus-lugil bitterly. "And tomorrow we'll be told it was for our own good, there are dangerous animals out there— Go on up to him, John. Don't act threatening, but give him an argument."

Lorenzen nodded. He approached till the musket was almost in his stomach. "Look," he said patiently, "we just want to take a walk. Anything wrong with that? All we want to do is take a stroll, and you're a flea-bitten son of an illegitimate alley cat."

The guard snarled, "No!" and tried to thrust him back.

Then Gummus-lugil was behind Lorenzen. He reached out and grabbed the musket and twisted the barrel aside. Lorenzen's own hand followed, jerking the weapon loose and stepping aside. The Turk leaped forward, his fist going before him. There was a dull crack, and the Rorvan lurched back and fell. Gummus-lugil tumbled on top of him, getting hands on his throat.

After a moment: "All right. Cut some pieces from his shirt—tie him up, gag him. Might be simpler to kill him, but—"

In a minute they were again moving up the tunnel, fast. There had been little sound, no alarm. But at any moment, the whole cave might wake with a scream.

The end of the passage loomed before them, blue-black darkness and the pitiless brilliance of the Hercules stars. They burst out of it, and the trees were around them and the sky overhead and they heard the remote squall of a hunting animal.

"Over here—away from the cave! Now the grease is in the fire, whatever we do." Gummus-lugil squatted under the low, massive bole of a tree and slipped off his radio set. His fingers were deft in the gloom, feeling for the controls. "Got to warm it up— What'll we do when we've sent the call?"

"I don't know. Try to hide out somewhere—or maybe surrender—" Lorenzen

drew a shuddering breath. He wondered if the pounding of his heart could be heard.

The dial face of the transceiver glowed, a round eye in the shadows. Gummus-lugil slipped on his earphones and tapped the sender key a few times, experimentally. "Not quite hot yet—"

An alarm went off, a high screaming note which went through Lorenzen like a sword. He sprang back, jerking his rifle up and sucking in a gasp of air. "They've found that sentry—"

"Or they have a hidden detector somewhere, set to whistle when we try calling base." Gummus-lugil cursed luridly.

Slim leaping forms were boiling up in the tunnel entrance, black against its light. A Rorvan voice howled above the yell of the siren: "Stop that! Stop that radio (?) or we will kill you!"

Gummus-lugil began tapping out his message.

Lorenzen ran away from him, zigzagging between the trees till he was several meters off. The wiry underbrush snagged at his ankles, he stumbled and cursed and crashed an elbow numbingly against a hidden branch. But the enemy's attention had to be drawn from the radio, Gummus-lugil had to live long enough to send the word. Lorenzen yelled defiantly. There was no time now to be frightened.

A dozen muskets cracked. He couldn't hear the hungry buzz of lead around his ears, but several slugs thudded into the tree behind which he stood. It was a heavy trunk forking into two main branches at one and a half meters' height; he rested his rifle in the crotch, squinting between the blur of leaves, and thumbed the weapon to automatic fire. The Rorvan sprang for him.

His gun spoke, a soft chatter, no betraying streaks of light. The indistinct mass of running shadows broke up. He heard them screaming raggedly, saw them topple, and even then felt the sorrow of it. *Djugaz, Alasvu, Silish, Menuha, Sinarru, you were good comrades. You were my friends once.*

The Rorvan drew back, out of the grove and away from the silhouetting cave entrance. They'd circle around and close in; but *dit-dit-dah-dit, dah-dit-dah,* every second they lost betrayed them.

Something like a tommy gun began to stutter, throwing a sleet of white-hot tracers into the darkness under the trees. So now they were pulling out their real armory! Lorenzen shot back, blindly, and waited for death.

More of them came from underground. Lorenzen fired, forcing them back; but some must be getting past his curtain of lead. The gunstock was cool and hard against his cheek. He was dimly aware of dew wet and heavy underfoot. A glow in the sky said that Sister was rising above the eastern mountains.

Something blazed in the cave mouth. Lorenzen saw a knot of Rorvan explode, falling and fleeing. Two figures loomed huge against the light—Thornton and von Osten; they'd heard the racket and come out to fight!

The German fired in the direction of the tracer stream. Suddenly it went out. Von Osten roared and moved away from the tunnel entrance. He wasn't quite fast enough. Lorenzen heard another metallic rattle. Von Osten spun on his heels, lifted his arms, and tumbled like a rag doll. Thornton flopped to the ground and wormed for the shadows.

The night was full of eyes and flying metal. The Rorvan had surrounded the

grove and were shooting wildly into it, even as they crawled and zigzagged their own way under its trees.

"John! Where are you?" The urgent whisper ran like a snake under the low gnarled branches.

"Over here, Kemal."

The Turk belly-crawled to Lorenzen's tree and stood up with his rifle poised. The first pale streaks of moonlight fell between the leaves and dappled his face. There was no sound of victory in his tones, no time for that, but he muttered quickly: "I got a message off. Not time for much of one, just that we were in trouble with the natives and they weren't really natives at all. Now what?"

"Now," said Lorenzen, "I guess we just stand them off as long as we can."

"Yeh. It'll take the boys at base a while to play back my message, and triangulate our exact position, and send some armed boats here. We won't last that long."

Gunfire crackled to their right. A heavy form rose and burst into the grove, running fast. "Over here!" cried Lorenzen. "Over here, Joab!" He and Gummus-lugil fell to their stomachs as lead snapped after his voice.

The Martian, almost invisible in his black pajamas, eeled up to them. He was breathing hard, and a stray moonbeam turned his face chalky. "Heard the noise . . . got up, saw you gone. Avery said stay there, but—Rorvan tried to stop us, we fought through them. Just a guess you were being attacked, but a right one. What's going on?"

Lorenzen didn't answer. He was leading a crawl away from their position, toward a spot of deeper shadow. Here several trees grew almost in a circle, forming a high barricade. They slipped between the trunks and stood up, leveling their rifles in three directions through the boughs.

Then the Rorvan charged, and for a moment it was all blaze and thunder, yelling and shooting, golden-eyed shadows rushing out of shadow and falling again. A couple of grenades were lobbed but exploded on the outside of the natural stockade. The Solarian rifles hammered, hosing explosive shells. Rorvan bullets wailed and thudded, other tommy guns were waking up, a storm of killing.

The charge broke and drew back, snarling in the moon-spattered darkness. A few wounded aliens crawled out of sight, a few dead lay emptily where they had fallen. There was a sharp reek of smoke in the chill windless air.

Stillness, for what seemed like many minutes. Then a human voice called out of the dark: "Will you parley?"

Avery's voice.

XVII

"All right," said Gummus-lugil. "Come alone."

The moon rose higher, and a long slant of light caught the psychman as he stepped from behind a tree. There was no sight of the Rorvan, no sound from them where they lay ringing in the place of siege. After the racket of battle, it was as if an immense hush had fallen over the world.

Avery walked up to the ring of trees and looked into the mouth of a rifle. "May I come inside?" he asked gently.

"Yes, I guess so," said Gummus-lugil.

The psychman forced his body between two boles. Lorenzen's eyes were getting used to the darkness now, he could see Avery's face vaguely, and there was no mistaking the horror that wobbled in his voice. "What do you want?" asked the astronomer harshly.

"To find out if you've gone crazy, all of you . . . why you turned on your hosts, friendly natives—"

Gummus-lugil laughed sardonically. Thornton shrugged and murmured: "They didn't seem very friendly when they killed Friedrich von Osten."

Lorenzen made the full answer: "They aren't natives, and you know that as well as I do. You ought to! Or are you really one of them in disguise?"

"What do you mean?" cried Avery. "Are you all gone crazy?"

"Stow it," said Lorenzen wearily. In a few cold words, he explained his conclusions. "And what has happened since certainly bears me out," he finished "They detected our radio. They produced submachine guns as good as any a Sol. And they tried to kill us before we could call base."

Thornton whistled, and then clamped his lips thinly together. Avery nodded with a great weariness. "All right," he said tonelessly. "What did you tell the camp?"

"What I've told you."

"There wouldn't have been time. Not in Morse code."

Lorenzen felt admiration for the brain behind that pudgy face. "You win," he said. "But we did get across that we were in trouble and that the Rorvan are not natives. With that much of a clue, Hamilton can put two and two together as well as I."

"You might tell the Rorvan that," said Thornton. "If they kill us, the boats from camp should be prepared to—punish them."

Suddenly Avery was raging. He shook his fist, standing there in the middle of them, and spat at the shadowy ground. "You fools! You utter blind blundering idiots! Don't you realize—the Rorvan run the galaxy! You've set yourselves up against the Galactic Empire!"

"I wondered about that—" whispered Gummus-lugil.

"Call the camp again. Tell them to stay away from here. They wouldn't have a chance. The Rorvan science is ten thousand years ahead of ours." Avery's voice dropped, becoming calmer, but he spoke fast. "It may not be too late to repair the damage. If you'll help me flange up a story that will satisfy Hamilton, things can still be patched up. But Sol must never know her true status. I'll explain why later, to you three only. But move, now! Stop those boats!"

Almost, he had them. The whip-crack in his voice brought Gummus-lugil's rifle down and the Turk half turned, as if to go back to his radio. Thornton's long jaw sagged.

Then Lorenzen laughed. "A nice try, Ed," he said. "But it won't go over, you know."

"What are you talking about? I tell you, if those boats come here they'll be disintegrated, the Rorvan will have to wipe out the whole camp and the ship—"

Lorenzen's mind felt unnaturally cold and clear, it was like the high chill heaven above him. His words came hard and fast: "If the Rorvan are that

good, why didn't they just annihilate us with a disintegrator beam? Or jam our radio? Why did they go through all this clumsy deception in the first place? No, Ed, you're bluffing again." Wth an angry snap: "And now you can tell us the truth or get out of here!"

Something broke in Avery. It was indecent, watching the sudden sag in him, how he slumped over and dropped his eyes. Lorenzen was obscurely glad the light was so dim.

"The boats ought to be loading," said Thornton. "It won't take them many minutes to fly here."

Sister was well above the mountains now, her strange face turned to a blue-green crescent ringed in by a thousand frosty stars. A low little wind sighed through the grove and rustled the leaves. Out in the shadows, two Rorvan spoke together, a dull mutter of unhuman voices; and far off, the sea pulsed on a wide beach.

"All right," whispered Avery.

"It's some plan of your clique in the government at home, isn't it?" Lorenzen thrust relentlessly against the man's buckling resistance. "You were the boys responsible for the *Da Gama* and for all our troubles, weren't you? Tell me, did you hire the Rorvan for this job?"

"No. No, they just happened to be here when the *Hudson* came." Avery spoke so soft that it was hard to make him out. "Their home lies, oh, I guess ten thousand light-years from Sol; it's an Earthlike planet, and their civilization is at about the same stage as ours, technologically. They were also hunting worlds to colonize. This expedition found Troas and was investigating it when we showed up. They saw our ship transitting the moon as we went into orbit—

"They got alarmed, of course. They couldn't know who we were, or what we intended, or . . . anything. They moved their own big ship into an orbit normal to ours and farther out; naturally, not looking for any such thing, none of us have spotted it. They camouflaged their spaceboats and their camp, that job was done before we'd gotten around to photographing this particular area. For a while they watched us from space as we set up our camp and began working. It wasn't hard to guess that our intentions were the same as theirs, but, of course, they wanted to be sure, they wanted to know all about us while betraying as little as possible about themselves. So they decided to pose as natives. The party which guided us here was set down a few kilometers from our camp, after its artifacts had been manufactured in their machine shop. It went in on foot—"

"Nice idea," murmured Thornton. "The strategy is even brilliant. Naturally, we would show and tell much more to primitive natives than to alien spacemen who might be potential enemies or competitors."

"Meanwhile," resumed Avery, almost as if he hadn't heard, "the rest of them were making this fake village. A heroic labor, even with their machinery and atomic power to help. They figured the presence of civilized natives—if we could be fooled into believing that—might scare us off for good. You guessed rightly, John. So did I, as I studied their language back in camp. Little discrepancies kept popping up, things for which a psychman gets a kind of feel. I finally confronted Djugaz with the evidence and told him I wanted to help. Since then I've been working with the Rorvan."

"Why?" Gummus-lugil shouted.

"I wanted to spare the *Hudson* the fate of the *Da Gama*."

Silence again. Then: "Murdered, you mean?" growled Thornton.

"No. No, let me explain." The flat, beaten voice ran on, under the shadows and the distorted moon. "You know the doctrine for a returning interstellar ship, one that's landed men on a new planet. It calls the Patrol base on Ceres, Triton, Ganymede, or Iapetus, whichever is closest, makes a preliminary report, and gets clearance for Earth. We knew the *Da Gama* would report to Ceres, and we suspected it would report Troas colonizable. So we took care to have Ceres base staffed with men loyal to us. When the ship returned and called, it was boarded and taken over. But no one was hurt. You remember New Eden? The very beautiful planet of Tau Ceti which has civilized natives? We've made an arrangement with them. The men of the *Da Gama* are there. It isn't prison, they're free to live as they wish. But we don't want them back at Sol!"

"A lot of them had families," said Gummus-lugil.

"Somebody has to suffer a little in great causes. The families have been pensioned. But I still wanted to spare all of you even that much. I wanted too . . . well, I have my own wife and kids. I was chosen by lot to be psychman for this expedition, and was ready never to see my people again. Then this looked like a chance . . . we could have come home in the normal way, reported failure, Troas would have been forgotten—"

"All right," said Lorenzen. "So the psychocrats want to keep man from colonizing. Before long, the economic failure of interstellar travel is going to keep him from the stars completely. Now tell us why."

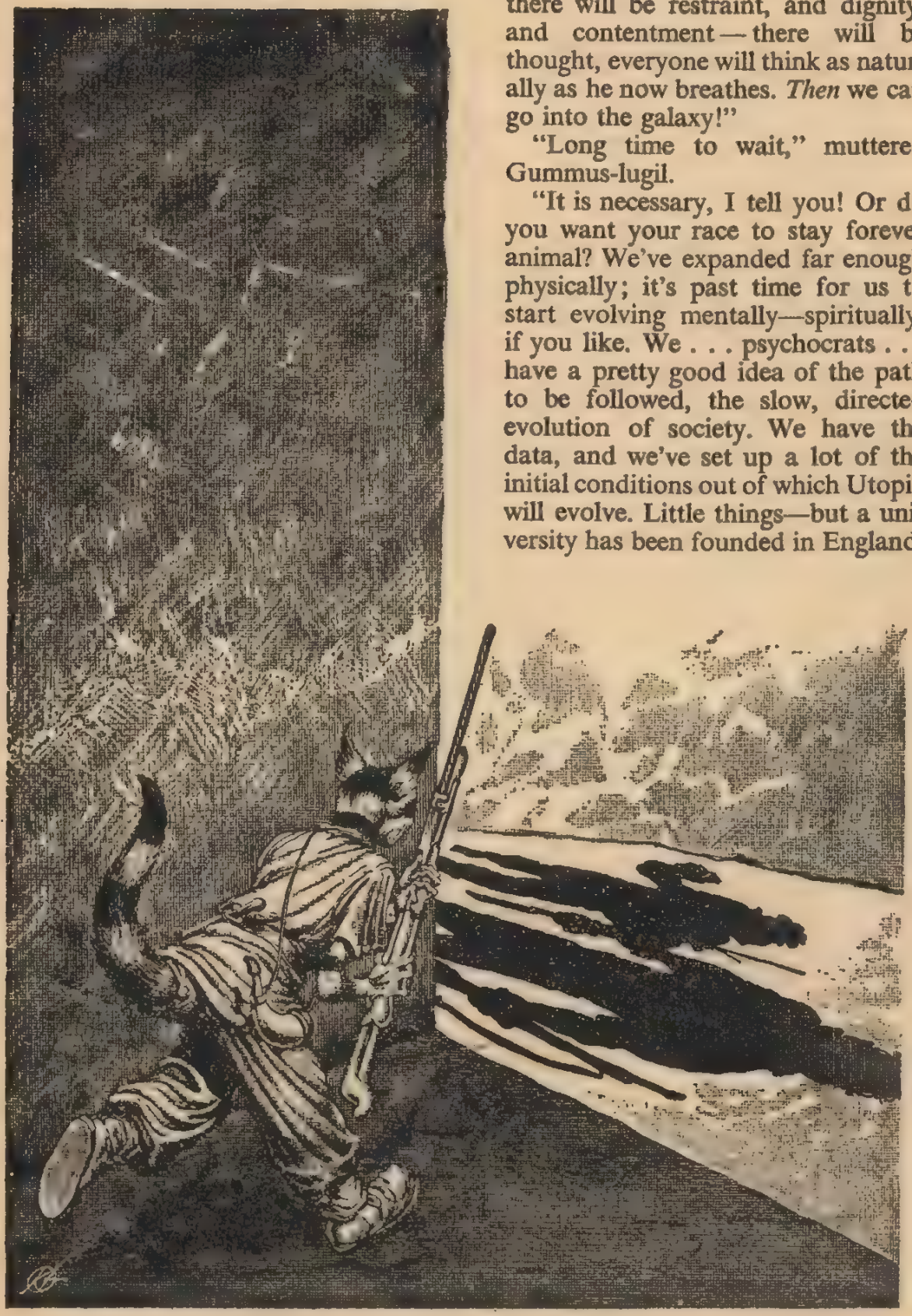
Avery looked up. His face was tortured, but a dim hope stirred in his tones. "It's for the best," he said eagerly. "I want you to work with me, fool Hamilton and the others when they arrive—we can talk about an unfortunate misunderstanding, a riot, some such thing—I tell you, the whole future of our race depends on it!"

"How?"

Avery looked higher, up to the cold glitter of the stars. "Man isn't ready for such a step," he said quietly. "Our race's knowledge has outstripped its wisdom before now, and we got the two-century hell from which we've just emerged. The psychodynamic men in government were opposed to the whole idea of interstellar travel. It's too late to stop that now, but we hope to choke it off by discouragement. In a thousand years, man may be ready for it. He isn't yet. He's not grown up enough."

"That's your theory!" snapped Gummus-lugil. "Your brainsick theory!"

"It is history, and the equations which interpret and explain and predict history. Science has finally gotten to a stage where man can control his own future, his own society; war, poverty, unrest, all the things which have merely happened, uncontrollably, like natural catastrophes, can be stopped. But first man, the entire race of man, has to mature; *every* individual must be sane, trained in critical thinking, in self-restraint. You can't change society overnight. It will take a thousand years of slow, subtle, secret direction—propaganda here, education there, the hidden interplay of economics and religion and technology—to evolve the culture we want. It won't look like anything which



has gone before. Men won't be blind, greedy, pushing, ruthless animals; there will be restraint, and dignity, and contentment — there will be thought, everyone will think as naturally as he now breathes. *Then* we can go into the galaxy!"

"Long time to wait," muttered Gummus-lugil.

"It is necessary, I tell you! Or do you want your race to stay forever animal? We've expanded far enough physically; it's past time for us to start evolving mentally—spiritually, if you like. We . . . psychocrats . . . have a pretty good idea of the path to be followed, the slow, directed evolution of society. We have the data, and we've set up a lot of the initial conditions out of which Utopia will evolve. Little things—but a university has been founded in England,

and in another two centuries Europe will again be a full member of civilization; the balance of economic power is gradually shifting into Asia, India will become a leading part of the Union, the contemplative Hundu philosophy will tend to leaven the aggressiveness of Western man, We have it planned, I tell you. Not in detail, but we should know where we're going—"

"I think I see," murmured Lorenzen. The wind wove around his voice, and a moonbeam flitted across his eyes. "Interstellar travel would upset this."

"Yes, yes!" Avery was speaking easily now, his tones played on them, vibrating through the grove like prophecy. "Suppose men learn that Troas is habitable. The Rorvan can't compete, they haven't our talent for military organization—that's why they were bluffing, and if the bluff fails they'll bow out and go look for another planet. It'll change the whole attitude of man. Suddenly the psychic atmosphere will become another one.

"If desultory search turned up one usable planet in twenty years, then a fleet of hunters would almost guarantee one every four or five years—more territory than we will ever need. Men will realize they *can* emigrate after all. The orientation of society will change, outward instead of inward; there will be no halting that process.

"Our psychodynamic data won't be valid any longer, we'll be as much in the dark as anyone else. The rush of emigration will produce a turmoil which we couldn't possibly control, our created conditions will vanish and we won't be able to set up new ones. The colonists will tend to be elements which were malcontent at home, and many of them will be rather unfriendly to Sol's government for a long time to come—more trouble, more unpredictability, no way to direct it at all! Before long, the scale of human society will become so big as to be forever beyond control! The idea of a unified galaxy is nonsense, if you stop to think about it; there isn't that much trade or intercourse of any sort. A million eccentric little civilizations will spring up and go their own ways—

"Interstellar exploration will be given a tremendous boost. Absolutely unpredictable new factors will forever be entering, to prohibit stability . . . alien planets, alien civilizations, new knowledge about the physical universe, mutations—

"And man will again be the victim of chance. There will be chaos, and suffering, the rise and fall of whole cultures, war and oppression, from now till the end of time!"

He stopped for a little while, his words rolling away into silence. The four of them stood unmoving, huddled together inside a ring of alien guns. It was as if they had waited.

"All right," said Avery at last. "You have my answer. Now I ask for yours. Will you help me explain all this away; will you go back home and keep your mouths shut for the rest of your lives? It's asking a lot of you, I know—but can you face the future you have betrayed if you don't?"

XVIII.

They stared at each other. "You'll have to decide quickly," said the psychman. There was a sudden calm over him, he met their gaze and smiled a little in the wan half-light. "The boats will be here any minute now."

Gummus-lugil scuffed the ground with his boots. Misery twisted his face. Thornton sighed. It was Lorenzen who felt decision hard and sharp within himself, and who spoke.

"Ed," he asked, "do you *know* all this is true?"

"I've worked with it all my life, John."

"That isn't an answer. In fact, you've used more than your share of semantically loaded words tonight. I asked how certain your conclusions were —about what will happen if man stays in the Solar System, and what if he doesn't."

"The first is a virtual certainty. We *know* how history can be made to go. Of course, you could always say what if a dark star crashes into our sun—but be reasonable!"

"Yet you say with one mouth that if man goes to the stars, his future is unpredictable and his future will be black."

Gummus-lugil and Thornton jerked their heads up to stare at Lorenzen.

"Unpredictable in detail," said Avery, with a ragged edge in his tone. "In general outlines, I can foresee—"

"Can you, now? I doubt it. In fact, I deny it altogether. Reality, the physical universe and all its possibilities, it's just too big to be included in any human theory. And if things go wrong somewhere in the galaxy—there may well be other places where they go right, more right than you or anyone else could predict."

"I didn't say we should stay out of space forever, John. Only till we've learned restraint, and kindliness, and the difficult process of thinking—"

"Till we've all become molded into the same pattern—*your* pattern!" said Lorenzen harshly. "I claim that man crawling into his own little shell to think pure thoughts is no longer man. I claim that with all our failures and all our sins, we've still done damn well for an animal that was running around in the jungle only two hundred lifetimes ago. I like man as he is, not man as a bunch of theorists think he ought to be. And one reason we've come as far as we have is that nobody has ever forced the whole race into a copy of himself—we've always had variety, always had the rebel and the heretic. We need them!"

"Now you're getting emotional, John," said Avery.

"A neat, loaded answer, Ed, which dodges the fact that this is an emotional issue. A matter of preference and belief. Personally, I believe that no small group has the right to impose its own will on everybody else. And that's what you were doing, you psychocrats."

Lorenzen turned to the others. "I vote for telling the truth, going out to the stars, and taking the consequences," he said. "Good, bad, or most likely indifferent, I want to see what the consequences are, and I think most men do."

Avery's eyes pleaded with the remaining two.

"I . . . I am with you, John," said Thornton. "Men ought to be free."

"I want that little farm," said Gummus-lugil. "And if my great-great-great-grandson can't go find his own, then the race will've gone to hell and it's just too bad for him."

Avery turned from them, and they saw his tears.

"I'm sorry, Ed," whispered Lorenzen.

Now it was only to tell Hamilton and the rest of the crew. The *Hudson* would go home; she would not call the Patrol, but head for Earth and tell her story

directly to its radios. Then it would be too late for suppression. The government would fall, there would be a new election, the psychocrats would be booted out of office—Lorenzen hoped some of them could return later, they were good men in their way and would be needed in the days to come. But it didn't matter much, one way or another, not when men were looking up again to the stars.

"I should ask the Rorvan to kill you," said Avery. His voice came thin and shaking as he wept. "I won't, but I should. You've sabotaged the real future of man, maybe the future of the entire universe. I hope you're pleased with yourselves!"

He stumbled from them, back into the forests. Lorenzen saw flitting shadows out in the night, the Rorvan were retreating—back to their own spaceboats, he guessed. Maybe they'd take Avery with them, to hide till the anger of men had faded.

From afar he heard the nearing thunder of Hamilton's rockets.

Two men and one alien, as much a thinking, feeling creature as they, had died, and a government and a dream would follow them, so that all men might own the sky. Had Avery been right after all?

Lorenzen knew bleakly that his last question would not be answered for a thousand years. There might never be an answer.

THE HUNTING LODGE

(*Continued from page* 26)

That was all I needed. I tossed the stunner into the water that trickled slowly toward the elevators and walked back toward my room with my hands up.

I'll say this for the staff at Dellfield; they don't get sore when a patient tries to escape. When five more guards came down the hall, they saw my raised hands and simply herded me into the room. Then they watched me until the colonel came.

"Well," he said, looking things over. "Well. Neat. Very neat. Have to remember that one. Didn't do much good, though. Did it? Got out of the room, couldn't get downstairs. Elevators don't come up."

I shrugged. "Can't blame me for trying."

The colonel grinned for the first time. "I don't. Hate a man who'd give up—at any time." He lit a cigarette, his gun still not wavering. "Call didn't do you any good, either. This is a hospital. Patients have reached phones before. Robot identifies patient, refuses to relay call. Tough."

I didn't say anything or look anything; no use letting him think he had touched me.

The colonel shrugged. "All right. Strap him."

The attendants were efficient about it. They changed the wet bedclothes and strapped me in. I couldn't move my head far enough to see my hands.

The colonel looked me over and nodded. "You may get out of this. O.K. by me if you try. Next time, though, we'll give you a spinal freeze."

He left and the door clicked shut.

Well, I'd had my fun; it was out of my hands now. I decided I might as well get some sleep.

I didn't hear any commotion, of course; the room was soundproof. The next thing I knew, there was a Decon robot standing in the open door. It rolled over to the bed.

"Can you get up?"

These Decontamination robots aren't stupid, by any means.

"No," I said. "Cut these straps."

A big pair of nippers came out and began scissoring through the plastic webbing with ease. When the job was through, the Decon opened up the safety chamber in its body.

"Get in."

I didn't argue; the Decon had a stun gun pointed at me.

That was the last I saw of Dellfield Sanatorium, but I had a pretty good idea of what had happened. The Decontamination Squad is called in when something goes wrong with an atomic generator. The Lodge had simply turned in a phony report that there was generator trouble at Dellfield. Nothing to it.

I had seen Decons go to work before; they're smart, efficient, and quick. Each one has a small chamber inside it, radiation shielded to carry humans out of contaminated areas. They're small and crowded, but I didn't mind. It was better than conking out from a psychosomatic heart ailment when the therapists started to fiddle with me.

I smelled something sweetish then, and I realized I was getting a dose of gas. I went by-by.

When I woke up again, I was sick. I'd been hit with a stun beam yesterday and gassed today. I felt as though I was wasting all my life sleeping. I could still smell the gas.

No. It wasn't gas. The odor was definitely different. I turned my head and looked around. I was in the lounge of Senator Anthony Rowley's Lodge. On the floor. And next to me was Senator Anthony Rowley.

I crawled away from him, and then I was *really* sick.

I managed to get to the bathroom. It was a good twenty minutes before I worked up nerve enough to come out again.

Rowley had moved, all right. He had pulled himself all of six feet from the spot where I had shot him.

My hunch had been right.

The senator's dead hand was still holding down the programming button on the control panel he had dragged himself to. The robot had gone on protecting the senator because it thought—as it was supposed to—that the senator was still alive as long as he was holding the ORDERS circuit open.

I leaned over and spoke into the microphone. "I will take a flitter from the roof. I want guidance and protection from here to the city. There, I will take over manual control. When I do, you will immediately pull all dampers on your generator.

"Recheck."

The robot dutifully repeated the orders.

After that, everything was simple. I took the flitter to the rendezvous spot,

was picked up, and, twenty minutes after I left the Lodge, I was in the Director's office.

He kicked in the hypnoes, and when I came out of it, my arm was strapped down while a surgeon took out the Gifford ID plate.

The Director of the FBI looked at me, grinning. "You took your time, son."

"What's the news?"

His grin widened. "You played hob with everything. The Lodge held off all investigation forces for thirty-odd hours after reporting Rowley's death. The Sector Police couldn't come anywhere near it.

"Meanwhile, funny things have happened. Robot in Groverton kills a man. Medic guard shoots down eighteen men coming out of a burning house. Decon Squad invades Dellfield when there's nothing wrong with the generator.

" Now all hell has busted loose. The Lodge went up in a flare of radiation an hour ago, and since then all robot services in the city have gone phooey. It looks to the citizens as though the senator had an illegal hand in too many pies. They're suspicious.

"Good work, boy.' '

"Thanks," I said, trying to keep from looking at my arm, where the doctor was peeling back flesh.

The Director lifted a white eyebrow. "Something?"

I looked at the wall. "I'm just burned up, that's all. Not at you; at the whole mess. How did a nasty slug like Rowley get elected in the first place? And what right did he have to stay in such an important job?"

"I know," the Director said somberly. "And that's our job. Immortality is something the human race isn't ready for yet. The masses can't handle it, and the individual can't handle it. And, since we can't get rid of them legally, we have to do it this way. Assassination. But it can't be done overnight."

"*You've* handled immortality," I pointed out.

"Have I?" he asked softly. "No. No, son, I haven't; I'm using it the same way they are. For power. The Federal government doesn't have any power any more. I have it.

"I'm using it in a different way, granted. Once there were over a hundred Immortals. Last week there were six. Today there are five. One by one, over the years, we have picked them off, and they are never replaced. The rest simply gobble up the territory and the power and split it between them rather than let a newcomer get into their tight little circle.

"But I'm just as dictatorial in my way as they are in theirs. And when the *status quo* is broken, and civilization begins to go ahead again, I'll have to die with the rest of them.

"But never mind that. What about you? I got most of the story from you under the hypno. That was a beautiful piece of deduction."

I took the cigarette he offered me and took a deep lungful of smoke. "How else could it be? The robot was trying to capture me. But also it was trying to keep anyone else from killing me. As a matter of fact, it passed up several chances to get me in order to keep others from killing me.

"It had to be the senator's last order. The old boy had lived so long that he still wasn't convinced he was dying. So he gave one last order to the robot:

" 'Cet *Gifford back here—ALIVE!*'

"And then there was the queer fact that the robot never reported that the

senator was dead, but kept right on defending the Lodge as though he were alive. That could only mean that the ORDERS circuits were still open. As long as they were, the robot thought the senator was still alive.

"So the only way I could get out of the mess was to let the Lodge take me. I knew the phone at Dellfield would connect me with the Lodge—at least indirectly. I called it and waited.

"Then, when I started giving orders, the Lodge accepted me as the senator. That was all there was to it."

The Director nodded. "A good job, son. A good job."

IN THE BEGINNING

(*Continued from page* 78)

human race is intelligent enough to know what civilization is, to draw up the blueprints and start constructing it—but we can't live in it! Not stable enough, as far as I can see. As I said, fine savages—fit for caves and nothing else. Take the present time. The twentieth century has only another twenty-five years to go, and if you look back over—"

He stopped abruptly as the door opened.

President D. Abernathy Grosvenor entered, looking considerably uncomfortable. He was followed by Mrs. Featherby, who looked thoroughly triumphant.

Philo Putnam shoved away his coffee cup and stood up.

"Ah . . . Professor Putnam," President Grosvenor began. "I fear I have unpleasant news—"

"He means you're through!" Mrs. Featherby put in. "Finished!"

Putnam ignored her carefully. "I have a contract, you know, President Grosvenor," he pointed out.

The president's face became even more miserable. "Of course. We're really asking you to hand in your resignation. After all—if you're not wanted . . . what I mean is, there's no point—"

Professor Putnam nodded. "You're right. Don't worry about my resignation—you'll get it. But in return for my contract, I want a week of complete freedom to wind up my experiments, plus the right to take any specimens I want with me. Agreed?"

President Grosvenor seemed immensely relieved. "Certainly, Professor! And if there's anything else—"

"Yes. Get another secretary for the Biology Department. Miss Kalish and I are planning to get married, and she'll be leaving with me."

"I'm leaving, too," Oscar Felzen said moodily, pouring himself another cup of coffee.

Philo Putnam smiled approvingly. "Good! You'll come with us, too, then—" He caught sight of Mrs. Featherby and his smile froze. "This is still my laboratory for another week, President Grosvenor, so get *her* out of it before I—"

"Did you hear him?" Mrs. Featherby bellowed indignantly, as the president hurriedly bundled her through the door.

"Absolutely abominable, Mrs. Featherby. Thoroughly reprehensible." He

directed a last what-can-I-do-it's-my-job glance at Professor Putnam, and closed the door behind them.

There was a moment of silence.

"Where do we go from here, Professor?" Oscar Felzen asked gloomily.

Philo Putnam chuckled and snapped his fingers. "To my farm in Southern California, of course! You and I will raise the Neanderthalenses and continue with our experiments. Mis Kalish . . . Leona, I mean—" He turned to her with sudden concern. "You are coming with us, aren't you? What I said about us getting married—you will, won't you?"

Miss Kalish blushed and lowered her eyes. "Of course, Philo," she said softly. Then she raised her eyes again as a thought struck her. "*What* farm?"

Putnam threw back his head and laughed. "I've seen this coming for years," he told them, snapping his fingers again. "Been preparing for this ever since the first physicist was lynched. I've got a hundred acres of land in a practically unpopulated area. There's a well on it, though, and a good house, electricity and a fine lab. Plus my Proto-minks—"

"Professor! Look!" Oscar Felzen cried, pointing excitedly. "The green light is blinking over the first tank! The fetus is completed!"

Pausing only to whip on sterile gloves and a mask, Professor Putnam hurried over to the tank. Carefully, he lifted up the transparent top and put it aside. While the other two held their breaths, he reached in and lifted out the tiny, wrinkled occupant.

The baby gasped, wriggled in his arms, and began to whimper.

"I've done it!" the professor crowed. "What man has destroyed, man can re-create! And with the money we'll make from the Proto-minks—"

"*What* Proto-minks?" Miss Kalish demanded.

Professor Putnam chuckled. "Remember the mink from the glacial epoch, Oscar? The one that didn't seem to be of any scientific significance?"

Oscar nodded vaguely, removing a baby from the fourth tank. "I think so. But didn't we destroy them all?"

"All except two. I raised them on my farm. It turns out the adult Proto-mink has a fur that's superior to any living animal's. Makes sable and chinchilla look ratty. Stands to reason, you know. Comparatively speaking, we're living in an almost tropical climate. For real fur-bearing creatures, you can't beat a glacial—"

"But—what are you going to do with them?" his wife-to-be asked.

"Market the fur, of course! If nothing else, it'll keep us in food and lab equipment. With luck, we'll be completely independent economically."

Oscar Felzen appeared dubious. "It sounds a little farfetched, Professor. After all, none of us have any real business experience—"

"I hate to be told I can't do something," Professor Putnam told him irritably. "They told Appelbaum he'd never take a chromosome print which would reproduce the molecular structure of the gene, and then they told my old professor, Morelli, that he'd never find chromosomes in a fossil bone cell. Some of them even said there *were* no cells in a fossil bone! But he did it, and I transferred them successfully to a living zygote!"

Felzen shrugged, grinning. "O.K. So there are no limits to what the human mind can do. But what happens to your argument about the inferiority of Homo sapiens?"

Frowning, Professor Putnam emptied the last tank. "I don't know. Maybe that's why this experiment was so important to me. All of these experiments, in fact. We're finally reversing the age-old destruction, bringing back all the creatures we've so wantonly destroyed."

He handed the squalling infant over to Miss Kalish. "Don't misunderstand me, Oscar. It's not last month's Ichthyosaurus that matters, or Neanderthalis here. They're meaningless. But if from this work man learns to live with himself as well as with the other creatures around him, then humanity is on its way!"

The first Neanderthal baby woke up and began to cry lustily.

. . . his comparatively brief tenure. Though surprisingly ingenious, Sapiens was emotionally unstable. Throughout his thirty thousand years on earth, he made unceasing attempts to destroy both his own and all other species. To his credit, however, is the fact that, just before Sapiens' last—and successful—attempt at self-destruction, he re-introduced to Earth the more stable Homo Neanderthalensis II (q.v.) who was able to survive Sapiens' final cataclysm, thereby inheriting the planet and Sol's eventual position in the galactic—

—ENCYCLOPEDIA GALACTICA

IN TIMES TO COME

Next month, Mark Clifton and Frank Riley's collaboration, "They'd Rather Be Right" leads off. It's the first of four parts, the first novel Clifton's worked on—and has a basic proposition that's acutely uncomfortable. It's a sequel to "Hide! Hide! Witch!" and presents the consequences of the development of "Bossy," the computing machine.

Considering that it was done from the viewpoint of physical science, by electronics and information theory, written by a psychologist—it is a remarkably close parallel to the statement made a couple thousand years ago that "Ye shall not live save ye be born again."

Anybody want immortality? Bossy offers that—at a price practically no one will pay. Because, of course, who wants to die so he can live forever?

If that appears a somewhat confused statement—you'll find that Clifton & Riley have worked out a precise, detailed, and appalling sound presentation of the factors that make that statement rational and self-consistent.

Also coming up is "The Cold Equations," by Tom Godwin. Tom's done some good yarns for us, and handled some strong themes. This story is a genuinely memorable one, in effectively combining powerfully antithetic elements—harsh and brutal forces, and gentleness, a conflict that never was a conflict, because the answer existed before the problem was stated. It represents the one type of situation wherein there is but one solution—and that solution is both inescapable and unacceptable; the situation of a problem whose answer is known before the problem is!

It is, incidentally, a miniature of the problem of the whole world; sometimes we're actually living out a bit of already-recorded history, when we think we are living in the ever-changeable present. Sound impossible?

Not at all; it happens any time an irreversible decision-point has been passed. What follows is history—even when it hasn't happened yet!

THE EDITOR.

THE REFERENCE LIBRARY

THE COMPLETE BOOK OF OUTER SPACE, edited by Jeffrey Logan. Gnome Press, New York. 1953. Ill. 144 pp. $2.50; Maco Magazine Corporation, New York, 75c. (Published in Gt. Britain by Sidgwick & Jackson, 10/6d.)

Here's another newsstand sleeper which Gnome has snatched up and put in hard covers for you. It may remind you of the Fawcett "Mystery of Other Worlds Revealed," which was also a picture book of space, but this is far, far superior. It's certainly worth your seventy-five cents and I think it's worth $2.50 for the pictures alone, though the quality of the printing is not quite up to that in the Fawcett book.

Like the more ambitious Viking books, "Across the Space Frontier" and "Conquest of the Moon," this is a symposium in that each chapter or theme is taken by a different expert. Willy Ley has chapters on the development of the spaceship and the possibilities of life on other worlds. Wernher von Braun describes the space station and makes a plea for a co-ordinated space program. Heinz Haber writes on the United States Air Force space medicine program, Robert P. Haviland on the high-altitude work (Project Hermes), Oscar Schacter on the legal aspects of space travel, and Dr. Leslie R. Shepherd of the British Interplanetary Society on interstellar flight. These chapters, it seems, are adapted from lectures given at the Hayden Planetarium in New York.

To supplement the foregoing topics, the book has been rounded out with a history of the rocket engine by James H. Wyld, founder of Reaction Motors, Inc., a chapter on spacesuits by Dr. Donald H. Menzel of Harvard Observatory, one on exploitation of the Moon by Hugo Gernsback (the two latter from articles in Mr. Gernsback's *Science Fiction Plus*), and chapters on the spaceship in science fiction and on flying saucers, both by the editor.

The pictures come from everywhere.

FLIGHT INTO SPACE, by Jonathan Norton Leonard. Random House, New York. 1953. 309 pp. $3.50. (Published in Gt. Britain by Sidgwick & Jackson, 12/6d.)

Here, from the Science Editor of *Time*, is a book on space flight which is a reaction against the optimism and patricularity of von Braun, Willy Ley, Arthur Clarke and others whom we all know, and who see us on the way to the Moon and Mars within a few years.

You may find the early, descriptive sections of the book, in which the author describes graphically what he saw at White Sands and elsewhere, especially interesting. They're as well done as any of the kind that I've seen in print. But it seems to me that while he is scrupulously accurate in his facts—as so many other critics of space flight have not been—Mr. Leonard is too caustic in ridiculing the school of rockets-for-space represented by the two *Collier's* symposia, Willy Ley's books, and I suppose most of us.

The author doesn't say we can't and won't get into space: he does indicate pretty strongly his belief that there's no logical reason for doing it, except maybe the old Everest slogan, Mallory's "Because it's there." Not in our time, says Mr. Leonard. Better read him after you've looked over one of the enthusiasts' books—then go back, after the cold shower, and make up your own mind about what is probable and what's just wishful.

STAR SCIENCE FICTION STORIES NO. 2, edited by Frederik Pohl. Ballantine Books, New York. 1953. 197 pp. $2.00; paper 35c. (To be published in Gt. Britain by Boardman.)

The fourteen brand-new stories in this collection establish Ballantine's—and Frederik Pohl's—"Star Science Fiction" in the perennial class of the Bleiler-Dikty "Bests." You have to have them.

This second group opens with Alfred Bester's "Disappearing Act," a military satire with a novel twist on time-travel. It is followed by Theodore Sturgeon's "The Clinic," in which a handicapped alien struggles to find a place for his kind. These are top writing in anyone's category.

I'm not so fond of A. J. Budrys' "The Congruent People," in which Dexter Bergenholm is taken by a cab driver, Boskone, to see Hubert De La Meter about admission to the select circle of Stage Two beings, but Hal Clement, in "Critical Factor," has another of his technically beautiful imaginings of unimaginable beings, this time living petroleum pools which seep through the porous strata of the Earth's crust and investigate some new laws of nature. And Jerome Bixby's "It's a *Good* Life" is a completely terrifying picture of the activities of a monstrous child.

From Lester del Rey as from Sturgeon you expect thoughtful, moving, intensely human stories—the two are often confused. This time "A Pound of Cure" is a story of psychosis in a robotized culture. And a brand-new writer, Robert Crane, in "The Purple Fields," has done a grim bit about a future in which the young have taken over.

What the editor calls P. G. Dunsany-Blish, otherwise James, has in "FYI" a completely Jorkensy little item about what a medium learned of the ultimate mathematical structure of the universe. Anthony Boucher's "Conquest" points

out a basic lesson to be learned from cats—anyone else would have belabored his new principle of "trining" in interstellar exploration. Fletcher Pratt's "Hormones" is an inconsequential little farce which you can take as fantasy if you like, while Robert Sheckley's "The Odor of Thought" is a handsome variant on Wells' "Country of the Blind."

Jack Williamson's "The Happiest Creature" somehow misses being up to his own standard: it's another about benevolent supervisors protecting us from ourselves. And the shortest story in the book, C. M. Kornbluth's "The Remorseful," is another minor item in which superior visitors dislike what they find here—with reason! Finally, Richard Wilson's "Friend of the Family" presents still a third super-visitor, this time helping a young hill couple fight neighborly cupidity.

Bester, Sturgeon, Clement, Bixby, del Rey, Crane, Boucher are as good as you'll find anywhere and most of the others are up to the current average. What more do you want?

THE BEST FROM STARTLING STORIES, compiled by Samuel Mines. Henry Holt & Co., New York. 1953. 301 pp. $3.95. (Published in Gt. Britain as "Startling Stories" by Cassel, 12/6d.)

Don't look now, if you haven't been watching, but in the last few years *Startling* and *Thrilling Wonder*, under the skillful editing of the Sams—Merwin and now Mines—have begun to breathe hotly at the heels of the Big Three, *Astounding*, *Galaxy* and *Fantasy and Science Fiction*. More and more memorable stories have been showing up in the anthologies from the pages of what used to be the home of space opera and BEMs, and now this collection, actually from both magazines and going back only to 1948, drives the finishing nails.

"Best" is, I think, a misnomer because Samuel Mines has deliberately edited for variety: such items as Jack Lewis' "Who's Cribbing?" is trivial but fun, and breaks the pace of the book. But best or not, what you get is very good—as good as any collection in '53.

There are eleven stories in the collection. Ted Sturgeon's "The Wages of Synergy" opens the book—a typical Sturgeon study of the Emotional Man, which suffers a little from its whodunit angles near the end. It didn't need that element. R. J. McGregor's "The Perfect Gentleman" is another wry little story with a sexual theme: the "Castaway's Companion," never mishandled or out of good taste. Joel Townsley Rogers' "Moment Without Time" has been reprinted elsewhere, I think, and adds variety in subject matter but not too much else.

Ray Bradbury's "The Naming of Names" is to me one of the best of his Martian Chronicles, a delicate story of mood which doesn't shout too loudly. Sherwood Springer, in "No Land of Nod," handles the Adam-and-Eve story quietly and without leering.

"Thirty Seconds—Thirty Days," by Arthur C. Clarke, is in the author's realistic vein: personality vs. personality in a crisis in space. And Jack Vance, in "Noise," has a haunting little tale of one man alone on a strange world, quite different from any of his usual action yarns.

Another unexpected pleasure, and for me the highlight of the book, is Edmond Hamilton's "What's It Like Out There?" in which the man who invented the save-the-world formula writes as unformalized and straightforward a story as you'll find in any literary journal, about a spaceman home from Mars.

Closing the roster, A. E. van Vogt's "Dormant" is an alien-monster story back in the style and treatment of his first memorable stories for this magazine, "Black Destroyer" and its sequels, while Robert Donald Locke's "Dark Nuptual" is a very human sort of gimmick story.

Perhaps part of the impression this book made on me comes from the fact that I haven't followed the two magazines as closely as I obviously should, and that the stories were, therefore, new to me. But I still say it's an excellent collection by anyone's standards.

LOOKING FORWARD, edited by Milton Lesser. Beechhurst Press, New York. 1953. 400 pp. $4.95. (To be published in Gt. Britain by Cassell.)

Twenty stories for just under five dollars is the offering of this first anthology to be edited by Milton Lesser. It's not bad, and it has several very good stories in it, but even with the current cost of publishing, the price seems high.

Raymond F. Jones' "Production Test" is that rare gem, a *science* fiction story with a problem to be solved scientifically: the failure of spacesuit joints. Poul Anderson's "Last Monster" evokes sympathy for an other-worldling. Ray Bradbury's "In This Sign" has been good every time it has been reprinted, and still is. Murray Leinster's "The Power" has a predictable cynicism about it and Gordon Dickson's "Lulungomeena" deals with the humanity of nonhumans. Isaac Asimov's "Victory Unintentional" telegraphs its punchline, of course, but it's the development that counts.

The Jones and Leinster stories are reprinted from this magazine, as are Jack Williamson's "The Man From Outside," Lewis Padgett's "We Kill People," Eric Frank Russell's "Ultima Thule," and Lester del Rey's "Into Thy Hands." The others pretty well cover the field of current—or recently current—magazines.

THE SKY BLOCK, by Steve razee, Rinehart & C., New York. 1953. 247 pp. $2.75.

The dealers will be listing this as science fiction, so you'd better know what to expect. The science fictive element is only in the electronic gadget which gives the book its name, a weather control device operated by enemy agents who have holed up somewhere under Blue Peak in the Rockies. Beyond that it's a superior save-the-world thriller of the old E. Phillips Oppenheim, Sax Rohmer school as Platt Vercel is impressed by a discredited ex-general, assorted FBI men, "electrical wizards" and what have you into the effort to dig the villains out before they blow up the works. Borderline, but well done. I wouldn't buy it, but I liked it.

BRASS TACKS

Dear Mr. Campbell:

After reading your magazine steadily since October 1949, I am about to enter your continuing contest as outlined in "Times to Come," ASF August 1952. (U.S. edition.)

I notice in at least two instances that authors of stories appearing in your publication have previously appeared in Brass Tacks. Examples: Frank Robinson, BT ASF Feb. 1944, and Chad Oliver, BT June 1950. Ergo, step 1. To get published in ASF start with a thought provoking letter. Here it is.

After writing a few stories I appreciate much more fully the problems encountered in "warping the casual sequence of the past" on which principle "Demotion," by Robert Donald Locke, ASF September 1952 is based. For example, the changing of a datum near the last page of a story can so "warp the casual sequence" as to cause a high degree of inconsistency if all the factors relating to this datum are not also changed. I realize that if Mr. Locke had been thoroughly consistent in his story that "Demotion" would never have come into being, so hooray for inconsistency. But in other than "time" stories I suspect that inconsistency is the basis for many turn-downs of stories.

To get to a more current issue: In BT for January 1954 (BRE. June) Mr. Wilson comments that "We can be certain that no tools can ever be invented that will overcome this paradox." This may be perfectly correct according to the teachings of modern physics. But I personally shudder when I hear or see such a positive statement about anything. I am not so certain since I am not a physical scientist and, therefore, am not tied down by facts. But in my humble opinion maybe all that is required is a refinement of the observing instruments. Maybe a thought will eventually be thunk that will have a small enough physical effect so as to be negligible so that observation of an electron will not change its velocity and or position.

Really, I'm only kidding because I don't understand these things. When I get a physics book and try to wade through the atomic structure section, I bog down on vortices, waves, particles, and wavicles and usually end up with

a snorticle from the botticle—Robert E. Fogg, 1815 North 54th Street, Seattle 3, Washington.

Would clairvoyant vision disturb an electron?

Dear Mr. Campbell:

I read my first science fiction magazine in 1915 or 1916. Do not remember the name of the magazine, nor where or by whom published. I have read Astounding since it was first published, and do not believe I have missed over one or two issues. For some time readers of such magazines were considered "not quite right," and it has only been a few years since science fiction started taking its place as a forerunner of a good deal of our technological advancement in all branches of science.

I keep no file nor attempt to grade the stories in Astounding. Usually every story is well worth reading but some are better than others. The Lensman series, "Slan," "Final Blackout," and some others whose names I do not remember, I have particularly enjoyed. Actually I have never read a poor story in Astounding. I seldom read the article, nor the reference library and would rather see more fiction take the place of these two features; but am sure the majority of your readers are interested in them or you would not give them the space they occupy.

The basic theme of practically all science fiction is the existence of life on other planets and that, in my opinion, is a fact. It is inconceivable that in the infinite universe, life, in forms perhaps strange to us, or perhaps exactly the same as ours, does not exist, except on this planet. That would be the height of egotism; and the fact that nature, or God, or the Power that established the order upon which we live, does not seem to be concerned with the individual but with the advancement of life as a whole seems to bear this out. Le Comte du Noy in his "Human Destiny" attributes the origin of life to a higher Power, and seems to prove mathematically the impossibility of its occurrence spontaneously; a belief in which I strongly concur; and if so on this planet then it is true for others.

I seem to have run off into some extremely personal philosophy, of no interest, except to me; but it is interesting to speculate on such matters; and to proceed a little further. After this assumption of life on other planets, communication, sooner or later, is inevitable; and Atomic power will make this possible. As to who will make the first contact makes little difference. It will depend on technological factors. It may be that life was placed on all suitable planets simultaneously and this contact will be made by two or more life forms about the same time. Or some life form may advance faster than others and make a first contact independent of the others; but that this contact will be made I am sure—C. S. King, Box 328, Luling, Tesax.

The always fascinating thought is that that communication exists already—waiting the time we of Earth can attain the level necessary to join it without damage either to ourselves or Others.

JOHN W. CAMPBELL
PLEASE MAIL A MARKED ("TRADE SECRET" PAGE 10–56) COPY OF THE NOVEMBER 1953 (BRE. APRIL 1954) ASTOUNDING SCIENCE FICTION TO EVERY MEMBER OF THE CONGRESS OF THE UNITED

STATES ENCLOSE A SIMPLE NOTE WITH THE COMPLIMENTS OF JOHN. M. STROUD, CODE 256E UNITED STATES NAVY ELECTRONICS LABORATORY SAN DIEGO 52, CALIFORNIA ON BEHALF OF HIS FELLOW SCIENTIFIC WORKERS IN BASIC RESEARCH. SEND THE BILL TO ME AT THAT ADDRESS.

JOHN M. STROUD

Done!

Dear Mr. Campbell:

For the An Lab:

1. "Sucker Bait," by Isaac Asimov . . . 8 points
   What can I say? Asimov invariably turns out an excellent—at least!—yarn.
2. "Royal Road," by A. Arthur Smith . . . 7 points
   This is a story rich in color and fascinating in concept.
3. "Amateur," by Lee Correy . . . 6 points
   I have come to expect something much better from the author.
4. "The Greater Thing," by Tom Godwin . . . 4 points
   There is real drama, suspense, and pathos in the flight and defeat of the girl and the man, despite the clumsy paragraphs of philosophy; but "The thing in the dead city" is old-hat, the sadism of Harker is run-of-the-mill, and the story's final conclusion is so uninteresting that it is depressing.
5. "Runaway Home," by E. G. von Wald . . . 4 points
   Perhaps it is unfair to condemn a story because it isn't as good as another, but, remembering the beauty and poetry of "To the Stars," by L. Ron Hubbard, one of the few other stories to use the "time equations," "Runaway Home" seems very bad indeed.

Please urge Astounding's readers to use the point system. Mr. Ryan argues against it because, he believes, readers will change their ideas about, for instance, what is a 10-point story from month to month. Does he believe that rating the stories on the best of the issue, next best of the issue, et cetera basis will be more stable? One story, in the point system, may be rated 10 because the reader thinks, "I enjoyed this story to such a great extent that I expect to enjoy it for a long time;" or "This story will be remembered for its great originality." Another story in another issue may be rated number 1 in the present system because the same reader thinks, "This was a lousy story but it was the least repugnant in the issue—"

But, if the present system continues, the story described in the last evaluation will bring the author the bonus as surely as the story in the first two would.

The important thing about a story is what it does to the reader—whether it dazzles him with its plot, touches him with emotion, impresses him with its concept, interests him with its philosophy, or merely pleases him with its style —not whether it is the best in a particular issue of Astounding Science Fiction —Richard M. Hodgens, 74 Willow Street, Glen Ridge, New Jersey.

But we still have to pay a best-in-the-issue bonus so that's the data I need. The long-term best will get an additional bonus through book publication, usually.

RELATIVELY ABSOLUTE

(*Continued from page 3*)

Neither people cross-checked philosophy *and* engineering. The Romans had no respect for the airy-fairy philosophy of the Greeks; the Greeks never respected the harsh, materialistic Romans.

We did *not* get our legacy of Science from Rome or Greece; we got it from Islam, the only people who invented it in all human history!

We should laugh at Russia's curious maneuvers with inventors? We, who, because Islam was, at the time, the great and dangerous enemy, preferred to attribute their inventions to the long-conquered enemy, Rome and Greece? The early Christians hated Rome with a holy and burning hatred; read the New Testament's all out vilification of Rome! But that battle against Roman culture was long since won; it was safe, in 1400 A.D., to say that Romans and Greeks had been great and wise.

Islam was the enemy! *They* couldn't be wise or great!

So even a Czarist achievement is better than an American or French achievement in the eyes of the U.S.S.R.

Yes, I think we've played that same old game before. It has a familiar ring, even though the names are different. Some things that happen for the first time—aren't. Propaganda is much older than the word "propaganda." George Orwell's "Ministry of Truth" is much older than "1984."

The business about Islam, moreover, is important to the development of Mankind—because while Rome and Greece did not develop anything basically new, Islam did. And if we hide the fact that Islam, not Rome or Greece, invented science, we will miss the area in which must lie a unique force. Rome and Greece did *not* have that unique force; as pointed out above, many other peoples developed logic, mathematics, and engineering. Studying Rome and Greece for the source-force that generated that unique thing, Science, therefore, would lead to frustration. You won't be able to find it, no matter how finely you comb the records; it wasn't there in the first place.

The contribution of Islam has been heavily occluded by propaganda started in the age when the West and Islam were struggling. Actually most of our basic sciences are heavily larded with Arabic terminology. Chemistry has dropped the old Arabic prefix *al-* from it's own name, but it retains it in *alcohol*—the Mohammedans invented distillation—and a number of other instances. The *alembic* is no longer used, but chemists need the Arabic numerals—borrowed from India—and *al*gebra.

One of the major troubles was the chemists didn't borrow enough. Lavoissier is credited with introducing the balance into chemical investigations. But as early as the eighteenth century (A.D.) the Arab chemist Yber-Abou-Moussah-Djafer Al-Sofi reported that when metallic lead is heated and calcined in air, the resulting compound is heavier than the original metal. Somebody must have been using the balance a bit before Lavoissier thought of it.

Now at the time of Islam's greatest achievement, their influence extended from Spain to India. They were in contact with Hindu, Chinese, and other civilizations.

But, curiously, only two cultures in the history of Mankind have either invented or accepted Science. The highly civilized Chinese neither invented it, nor accepted it from the Arabs. The Hindus, likewise, failed either to invent or accept it. The Christians didn't invent it—but they did accept it.

In this, I mean by "science" that method of learning that involves the equal interaction and cross-checking of philosophical-theoretical thought, and actual physical-reality experiments, done as a conscious process for the consciously stated purpose of increasing knowledge and understanding—that is, increasing data and relationship-of-data.

Why? Why only these two?

Unquestionably, in any system so complex as a human culture, there is more than one factor. But we can find a factor that is present in these two, and missing in the others that achieved greatly—but didn't achieve Science.

The Scientific cultures have an Absolutistic philosophy—and a monotheistic philosophy. Remember that "religion" is, by derivation, the study of "the laws of things"—or "cosmology" in modern linguistic terms.

Both Mohammedanism and Christianity stem from the old Jewish philosophy of one God—an Absolute God, whose laws were absolute, and could be appealed only to the One Absolute God.

The Greeks were in a quite different Universe. It didn't have any single set of laws or rules; if Zeus made a ruling, one you found irksome, you could try getting Athena or Poseidon or Aphrodite, maybe, to change it. If there was some curious phenomenon observed—observe it and forget it. The whim of a god isn't lasting; some other god will change it. The smart man will study texts on "The Psychology and the Rivalries of the Gods," because that's the only way to get anywhere.

If an ancient Greek observed that it took longer to boil an egg on top of a mountain than it did at sea level—so what? You fool, don't you know Zeus and Poseidon dislike each other? Poseidon rules water; Zeus rules the upper air. What do you think is going to happen to water when you take it up nearer the upper air? Naturally it doesn't work as well.

And if you study Platonic philosophy, and find that it has certain uncomfortably binding restrictions on your actions—why the Sophist school is just as logical. It just appeals to other Gods—er, I mean other *postulates*—but it's just as logical, isn't it? Of course. And there's no need to stay with it, if it proves irksome; there are other philosophies, too.

A polytheistic cosology is not going to lead to the development of science. Science is, moreover, going to be a mighty unpopular philosophy in any culture; it has an absolutism about it that says "It makes no difference who you are, what you are, or what you want. Neither does it matter what your wealth is, or your political power. These are The Laws; obey or suffer."

It could be considered, even only by a culture that had already accepted the idea of an Absolute Power in the Universe.

The great difficulty with that problem is that, once you've found that Absolutes do exist—you're apt to go sort of absolutistic about it, and say "These are the Absolute Laws—and these are *absolutely all* the laws."

The Jewish people invented the monotheistic philosophy that made science

possible—but they didn't invent science. They had too much of the absolute, perhaps. The Arabs were relatively absolute—and invented Science.

Christians and Jews have done fine with it ever since; until very recently *nobody else has been able to!*

It rather looks, then, as though Einstein's relativity is an essential part of the philosophy necessary to developing Science—but must be recognized as being necessary, but not sufficient. There is reason to believe that *both* relatives *and* absolutes are necessary to a developing science—that either, if held to be the Be All and End All of the matter leads to stagnation and nonachievement.

Now it is interesting that the whole progress of science has centered around that area where there are Absolutes—the areas where no man has a right to his own opinion. The progress made in the social sciences, where opinion has been dominant, and everything has been fanatically relative, has been very small indeed. Psychology claims to be a "young science"; we can go into that question some other time, but it's worth pointing out that Aristotle did a fine textbook on psychology, sociology and anthropology some two-thousand-odd years ago. "The Confessions of St. Augustine" has a most thoughtful and intelligent study of guilt feelings. The Aesculapian priests of Greece were using narcosynthesis—drug hypnotherapy—some twenty-five hundred years ago. The age of the Hindu *Vedda* is considerably disputed, but it's not much younger—and has considerable data on clinical psychosomatic medicine using hypnotherapy. There's really been astonishingly little progress in humanic sciences in the last few millennia.

The progress has all been in those areas where dear old Mother Nature took a club to Man's thick skull, and said in effect, "This is the unit you'll use—whether you like it or not. Your opinion on the matter is completely unimportant. And yes, Tom, your opinion *is* just as good as Dick's or Harry's—and all three are no good whatever." Where Nature supplied absolutely non-relative *units*, like atoms and photons, Science got somewhere.

Want to have some fun with the relativity formulas? Try taking some different units, and see what happens to them! The relativity formulas involve a lot of higher power terms—squares, cubes, and higher. If you take your unit of velocity *not* as centimeters per second, but as *c*, then all the higherpower terms of c reduce to 1.00, no matter what the power is. Then the *v* terms all become fractional, and higher powers of fractions are *smaller* values than the original fraction, whereas higher powers of quantities greater than 1,000 are increased by self multiplication. By picking the right set of self consistent units, you can make the most marvelous hash out of the relativity formulas—without altering the formulas an iota!

And if we've got a relativistic universe, with no absolutes in it, then I can play deuces-wild with the units. You start being relativastic, and I'll relativastic you right out of business! I'll make as much of a mess out of your science as the humanic scientists have made out of theirs. All I need is the right to make my choice of units purely a matter of personal preference!

THE EDITOR.

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